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THE WORLD'S BIRDS

By the same Author.

BIRDS OF THE COUNTRYSIDE.

PETS AND HOW TO KEEP THEM.

ORNITHOLOGICAL AND OTHER ODDITIES.

GARDEN AND AVIARY BIRDS OF INDIA.

THE BIRDS OF CALCUTTA.

HOW TO KNOW THE INDIAN DUCKS.

HOW TO KNOW THE INDIAN WADERS.

FANCY PHEASANTS.

FANCY WATERFOWL.

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1908
Birds

THE WORLD'S BIRDS

A simple and popular classification
of the Birds of the World

BY

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AUTHOR OF

"Birds of the Countryside," "Garden and Aviary Birds in India,"
"Ornithological and other Oddities," &c., &c.

With over 50 illustrations from photographs (mostly
taken from living specimens) and outline figures
in the text.

LONDON

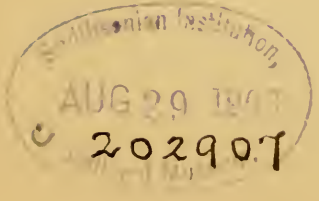
HUTCHINSON & CO.

PATERNOSTER ROW

1908

"I have some trifling skill in augury,
And can divine you, from its beak and eyes,
What sort of fowl it is."

THOMAS HOOD, "Lamia."


Smithsonian Institution
AUG 29 1907
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To the Trustees of the

INDIAN MUSEUM, CALCUTTA,

in grateful acknowledgment of the constant kindness and consideration shown to him when in their service, this book is dedicated by the Author.

ADDENDA.

TROGONS.—While this book was being printed a living Trogon, of the Cuban species (*Prionotelus temnurus*), has been imported into England in good condition by Mr. W. Frost.

WHALE-HEADED STORK.—The nestlings of this bird are clothed in reddish-grey down ; it utters a screaming and a laughing note, beside clattering its bill. The photograph attributed to Captain S. S. Flower on the plate, is by Mr. W. L. S. Loat (see Captain S. S. Flower's paper on this bird, *Avicultural Magazine*, May, 1908).

PREFACE.

THE present work is an attempt to afford a practical and comprehensive survey of the living birds of the world for the benefit of those who have not the time or inclination to engage in dissection or detailed museum work, but wish to form, from simple ordinary observation of living or stuffed birds, some idea of the relationships and attributes of the birds they may meet with, especially foreign species ; for presumably readers of this book will have made themselves acquainted with the familiar species of our own country, on which so many useful handbooks have been published.

The alphabetical order in which the families are treated has been adopted from the point of view of expediency, as the families of birds are so numerous, and their relationships to each other, even if they were completely agreed upon by ornithologists, could not in any case be exhibited naturally in linear order. When a sub-heading under any family is omitted, it is implied that the author had no information on that point.

The concise and systematic form in which the information about each family is given will, it is hoped, be found particularly convenient for reference, and the credit for this is due to Dr. P. Chalmers Mitchell, F.R.S., Secretary to the Zoological Society, who, before his appointment to that post, was engaged in writing a work somewhat on the present lines, in co-operation with the present writer, and has kindly allowed him to use the idea.

Dr. Mitchell's multifarious duties have put a stop to further joint undertaking, but I hereby wish to acknowledge my great indebtedness to him for his assistance, and to express my belief that, whatever merits the present work may be found to possess, they would have been much greater had he been my coadjutor throughout. As it is, he must not be held responsible for any statements made or opinions expressed in the work as it now stands.

The illustrations are mostly from living specimens now or formerly in the collection of the London Zoological Society, and they have been selected as far as possible with a view to giving life-like representations of birds belonging to families altogether unfamiliar, or of unfamiliar species of well-known families, rather than the repeated illustrations of well-known British birds so familiar in works on general ornithology.

FRANK FINN.

London, 1908.

LIST OF PHOTOGRAPHIC ILLUSTRATIONS.

Apteryx, Mantell's	*To face page*	76
Birds-of-Paradise	,,	97
Black Vulture	,,	2
Boatbill	,,	166
Brazilian Bush-shrike	,,	96
Bustard, Denham's	,,	3
Cariama	,,	10
Cat-bird	,,	118
Crocodile-bird	,,	16
Emu	,,	11
Falcon, Saker	,,	26
Finfoot	,,	38
Frigate-bird	,,	38
Frogmouth	,,	39
Goose, Magpie	,,	39
Guan, Orton's	,,	23
Hornbills	,,	62
Humming-birds	,,	63
Jay, American Blue	,,	104
Kagu	,,	69
Kakapo	,,	89
Kingfisher, Buff Laughing	,,	77
Kiskadee	,,	119
Lapwing, Australian Wattled	,,	154
Osprey	,,	27
Owl, Australian Barn	,,	88
Parson-bird	,,	105
Peacock-Pheasant	,,	44
Penguin, Yellow-crowned	,,	130
Pigeon, Blue-tailed Fruit-	,,	131

Porphyrio	*To face page*	145
Pratincole	,,	17
Puff-bird	,,	140
Rail, Ypecaha	,,	141
Rhea	,,	144
Road-runner	,,	22
Robin, New Zealand	,,	115
Rosy Pastor	,,	114
Secretary-bird	,,	149
Screamer, Crested	,,	148
Skua	,,	45
Spoonbill	,,	68
Sugar-bird, Purple	,,	16
Sun-bittern	,,	155
Thick-knee, Double-Striped	,,	162
Tinamou, Rufous	,,	163
Tody	,,	105
Toucanet	,,	166
Touracou	,,	167
Tropic-bird	,,	172
Whale-headed Stork	,,	173

OUTLINE TEXT-FIGURES.

	PAGE
Babbler	97
Bell-bird	102
Bulbul	101
Lyre-bird (head and foot)	109
Humming-bird (head and foot)	65
Kiwi (head and foot)	75
Ostrich's foot	84
Parrot (to show nomenclature of parts)	*Introduction.*
,, (head and foot)	89
Pitta	112
Toucan (head and foot)	165
Touracou (head and foot)	167
Trogon (head and foot)	169

INTRODUCTION.

THERE is no need to give any elaborate definition of birds; they are animals with feathers, the possession of these being a unique distinction. Among other vertebrates the reptiles are the most closely related to them, and, in fact, if birds did not possess feathers, it would be doubtful if they could be separated from the reptilian class. The feathers of birds, it may be noted, do not grow all over the body in most cases, but in definite tracts, differing in the various groups; these may be well seen in a young Pigeon or Sparrow while fledging.

In size and form birds do not display the same variation that is found in other vertebrates, such as beasts and fish.

The largest known bird is the Ostrich, which may stand eight feet high, and the smallest is the Vervain Humming-bird (*Mellisuga minima*), which is about the size of a large humble-bee.

There is no evidence from geology that any flying bird ever existed at all approaching the size even of the Rhea, and as large birds commonly have a difficulty in rising on the wing, it may be that flight, for birds over a certain size, becomes impossible. The heaviest known flying-bird appears to be the Great South African Bustard (*Eupodotis kori*), which may attain a weight of over fifty pounds, but its span of wing is little more than eight feet, whereas the largest Albatross may attain to a yard more than this.

With the exception of variations in the shape and length of the bill, neck and limbs, the shape of birds is very constant. The neck is always long compared with that of other animals, and very flexible, to make up for the inflexibility of the body, which is always comparatively short.

The true tail is movable only at the root and is always short, although the feathers on it may be of great length.

The fore-limbs or wings are modified for the support of the quill feathers; the bones of the hand being fused together and encased in a common skin, with the exception of the thumb, which carries a little plume of stiff feathers. The arm is folded up in a "*Z*" shape, with the hand or "pinion" pointing backwards.

The wings of flightless birds often show some departure from this type, but they are always obviously degenerate wings, pointing to the fact that their possessors have degenerated from flying birds, and do not bear any resemblance to the paws of reptiles. In many birds claws are present on the first finger, and in some cases on the second also.

On the hand or pinion grow the primary quills, which are the chief agents in flight. If they are clipped in both wings the bird cannot fly by reason of the reduction of the wing area, nor can it, if only one wing be operated upon, by reason of the destruction of the balance.

The secondary quills, which grow on the fore-arm, and largely or entirely cover the primaries in repose, can be clipped without destroying the power of flight.

The innermost secondaries are often different in form and colour from the rest, and are hence called tertiaries.

The remaining small feathers of the wing are known as coverts.

In flying birds the front edge of the wing nearest the body is formed by a membrane or web, which stretches

from the shoulder to the pinion joint; this is known scientifically as the Patagium.

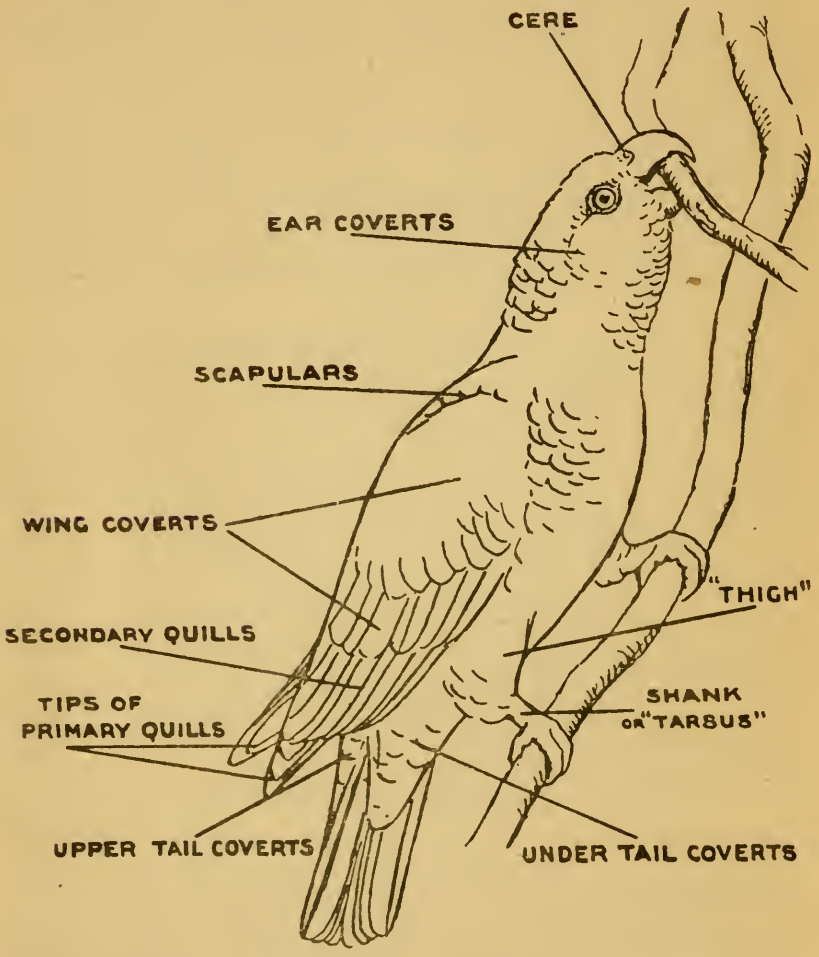
The legs are, in their way, almost as distinctive as the wings. The true thigh is short and tucked up closely to the body like the stifle-joint in a horse, to which it corresponds. What is called the thigh in describing a bird really corresponds to the leg of man from the knee to the heel.

The leg of the bird—the scaly part so called in popular language—is really the elongated instep; hence I prefer the non-committal term of "shank" for it. The term Tarsus, by which it is known ornithologically, is incorrect, as well as being unintelligible to most people.

No bird has more than four toes, the fifth toe found in some domestic fowls being a duplication of the hinder toe. The usual arrangement of the toes is three in front and one behind. This hind-toe corresponds to the first or great toe in man, but in birds it is usually the smallest of the four, often so small as to be useless, and not infrequently absent altogether. The second toe is often armed with a particularly large claw; it is absent in the Ostrich and in some Kingfishers. The third toe, or middle front toe, sometimes has a toothed edge to the inner side of the claw. This is, no doubt, to increase its efficiency in scratching, as all birds scratch themselves with this third toe. The outer toe is absent only in a small Chinese Babbler (*Cholornis paradoxa*). In many birds, however, as in Parrots and Woodpeckers, it is turned backwards, thus throwing the toes into two pairs. Such pair-toed birds often lose the hind-toe, which shows that the disposition of toes in pairs is no special adaptation to climbing.

The toes may be altogether free—that is to say, not connected by skin—or they may be more or less united by a common skin, as in Kingfishers, or more or less connected by a web or loose skin allowing of extension.

This is, of course, best developed in water-fowl, as it renders the foot more serviceable as a paddle, but it is often present to a small degree in land birds also, as in the common fowl, and its presence and degree of



Outline of Parrot to explain the less familiar and more useful terms used in describing birds (such terms as crown, throat, breast, &c., of course explain themselves).

development affords a useful character for the discrimination of families.

The shank and toes are usually covered with scales,

which vary in number and size. When they are very small and numerous the covering of the foot is said to be "reticulated" or netted. The scales down the front of the shank may be fused into a single plate, as in the Thrush. In some birds, as in Owls and Grouse, the shanks, and often the toes, may be covered with small soft feathers, but no wild bird produces the large stiff quills which grow on the sides of the feet of some tame fowls and Pigeons. As a general rule all the toes are provided with claws, usually curved and pointed, and there is never more than one toe without a claw.

The tail quills vary very much in length and proportions. When the outer ones are longest, as in Swallows, the tail is said to be forked, and this formation usually occurs in birds of powerful and graceful flight. When the centre ones are longest, and those outside of them diminish progressively in length, as in the Pheasant, the tail is said to be wedge-shaped or graduated. Birds with this form of tail are very seldom very powerful fliers, but taking the class all round, it is not easy to establish the relation of length and form of tail and powers of flight. In some birds the tail feathers are not quills at all, but soft, ordinary short feathers, as in Quails and Tinamous, or, in Grebes, a mere wisp of hairy-looking down.

The number of the tail feathers is normally twelve, or some number near it, as ten or fourteen. When more than the latter number exists, it is only in the case of birds where the tail is of no great importance in flight, as in the Swan and many of the Pheasants.

On the root of the tail is situated the oil-gland, almost the only skin-gland which birds possess, and with the creamy secretion of which they dress their plumage. It is not infrequently, however, ill-developed or absent; the surface of the nipple-like top of the gland is also sometimes naked and sometimes furnished with a greasy tuft of feathers.

The jaws or beak are encased with a sheathing of horn, except in Ducks and Flamingoes, where they are covered with a soft skin, except at the extreme tip. In many birds also, as in Hawks and Parrots, the basal part of the bill is soft, forming what is called the cere. The nostrils are usually at the point of the beak, but in some birds as, in Geese, Gulls and Cranes, they are central; in the Golden-eye Ducks (*Clangula*) nearer the tip than the root; and in the Kiwis (*Apteryx*), which are the only birds which go about sniffing for food like a beast, they are quite at the tip. The Kiwis, by the way, are not only the only birds which seem chiefly guided by their sense of smell, but the only ones in which the sight is deficient, for they seem to see but poorly.

The tongue usually corresponds to the length of the bill, but in some long-billed groups, as Ibises and Kingfishers, is remarkably short, and can be of little use. In Cormorants and Pelicans it is rudimentary. Except in honey-sucking birds, it can seldom be protruded far out of the mouth, and it may be mentioned that involuntary protrusion of the tongue in honey-suckers is a fatal symptom.

The eyes are generally large, and are furnished with a well-developed third eyelid, or nictitating membrane, a thin filmy skin which is seen sometimes to pass across the eye from its interior corner. This is the way birds wink, as a rule, and hence their want of expression to our eyes. Owls and Moreporks, however, blink with the upper eyelid like a human being, so also does the Water-Ousel or Dipper. Most birds, when closing the eye, bring the under lid upwards. In death the eyes are always closed, birds not dying with their eyes open like beasts.

Although birds do not possess external ears like beasts, and although the ear-opening is commonly overhung by a patch of stiff feathers, the ear-coverts, their sense of hearing seems to be quite equal to that of ordinary beasts.

It is not my intention here to go much into the internal structure of birds, but a few characteristic points may be noted. It will have been noticed by most observant people that a large part of the body is made up by the "breast," the great pectoral muscles which move the wings. The keel on the centre of the breast-bone affords increased space for the attachment of these. In most non-flying birds, the pectoral muscles having dwindled, this keel is wanting. The merrythought, or wish-bone, corresponds to the collar-bone in man, and varies a great deal in development in birds. When well developed, it indicates good powers of flight.

With regard to the internal organs, it will be noticed that the lungs and kidneys are closely pressed against the body wall, so much so that they are indented by the adjacent bones. The reproductive organs are also closely attached to the wall of the body, and outside the breeding season are much reduced in size, so that the sex is often not easy to distinguish by dissection.

The bones of birds are generally hollow to a greater or less extent, and contain air which passes into them from air-sacs situated in different parts of the body, which in their turn are connected with the lungs. This circulation of air in the body of birds may perhaps account for their sensitiveness to changes of temperature, which has for ages given them the reputation of weather prophets. The vocal organ of birds is the syrinx, situated at the base of the windpipe; the tongue does not influence the voice.

The bodily temperature in birds is very high, equalling fever heat in man. It is doubtful if they ever become torpid like beasts and reptiles, but Humming-birds, when exposed to a temperature too low for them, will become insensible, and will revive when warmed, as also will some young nestling birds, like young Canaries and Pigeons.

The digestion of birds is very powerful, the seed-

eating species having the hind portion of their stomach very muscular and thick; this is known as the gizzard, and acts as a grinding mill; the process is assisted by the gravel which the bird swallows for the purpose. Among insect-eating and carnivorous birds the hard parts of the prey are often ejected in the form of pellets, as by Owls and Fly-catchers, but some species with the same dietary have such powerful digestions that all such matter appears to be digested; at any rate, no castings are formed. Such is the case with Grebes and Starlings, for example; the former often eat and digest their own feathers. The Lämmergeier, or Bearded Vulture, has so powerful a digestion, that it feeds upon bones, coming to a carcase after the other vultures have left it. The appetite of birds is very great and their digestion rapid; all their bodily processes, in fact, are energetic, but, nevertheless, they are remarkably long-lived compared with beasts, though they present notable differences in this respect. The flightless birds seem to enjoy less long lives than flying species, and of these those attaining the greatest age are the larger kinds of Parrots, Birds of Prey, and Waterfowl; there is evidence that some of these may reach a century, while even small birds like the Canary may reach twenty years. They often, on attaining a great age, die almost suddenly, with little perceptible failing of the powers.

The senses of birds are very acute. Their hearing seems to be as good as that of beasts, while their sight is better than that of any other animal. Contrary to a very common idea, the nocturnal species appear to be able to see quite well by day, though the converse is not the case; although some birds with no special adaptation to night vision, such as Ducks, are constantly out at night, and a large number of the small diurnal birds perform their migration at that time, apparently to avoid enemies such as Hawks, Crows, and Gulls.

It is doubtful, however, if they have much sense of smell, and in many cases the sense of taste cannot be very acute. I have found, for instance, that birds will take certain insects and swallow them on the first trial, and then refuse the same kind afterwards. Thus it would appear that they are guided as to the quality of food by their stomachic sensations; and this is supported by the well-known fondness of Pigeons and Fowls for hemp-seed, which they swallow whole, and therefore cannot possibly taste it in the mouth. Their sense of touch is as delicate as can be expected, considering the fact that their body is covered with feathers or horn: their feet seem to be the most sensitive part, and are easily hurt, a fact which some intelligent species take advantage of when fighting.

The battles of birds are very often severe, and in some cases they have special weapons, such as the two spurs on the wings of the Screamers and the single one on those of the Jaçanas and some birds of the Plover and Duck families. Leg-spurs are only found among the game-birds, and generally in the males only of these. In some they may be as many as four in number. In some birds, like the Crane and Cassowary, the enlarged claw of the inner toe is used as a weapon. Birds of prey, when fighting, very commonly turn on their backs, so as to use their talons to good effect.

Birds naturally fight a great deal at the season of courtship, and the general consensus of observers is to the effect that the hen bird usually falls to the lot of the strongest male present. This somewhat discounts the value of the selection supposed to be exercised by the female in favour of the handsomest male, but it is well known to bird fanciers that the hens do show individual preferences, and a sufficiently extended series of experiments might prove that they really are attracted by superior beauty. The positions assumed by the male bird in courtship appear to be those expressive of emo-

tion generally, since anger or even fear will often cause the bird to put itself into courting posture. Similarly also birds will sing at times through anger or fear.

It must be remembered what we call singing in birds is to a certain extent an arbitrary term, meaning simply a sound that we ourselves like. It is a commonplace of moralists that beautiful birds do not generally sing, but examination of the facts will show that the most brilliant birds generally belong to families none of which sing; thus the Partridge does not sing any more than the Peacock; while the singing birds generally belong to a group in which no species is brightly coloured, such as the Skylark. Where a bright-coloured species belongs to a singing group the power of song may be present in addition to brilliant colouration. Thus the American Red Cardinal (*Cardinalis cardinalis*), perhaps the showiest of all finches, has long been known as the Virginian Nightingale.

The nesting arrangements of birds vary a great deal. The eggs may be simply laid on the bare ground or rock, as by the Nightjar or Guillemot; or a nest of varying elaborateness may be built, the most wonderful, perhaps, being the beautifully woven structures of the Weaver-birds. The elaborateness of the nest does not depend upon the clumsiness or otherwise of the bird, as has been stated. Parrots, for example, do not usually build nests, but breed in holes; but this is not because they are clumsy, because the only nest-building Parrot, the Grey-breasted or Quaker Parrakeet (*Myopsittacus monachus*), builds a very elaborate structure of twigs. The clumsily-shaped Broadbills (*Eurylæminæ*) also build elaborate nests. The Parrakeet above-mentioned builds a communistic nest, several pairs uniting to build a structure with several rooms, and this principle is further carried out by the well-known Social Weaver-bird (*Philetærus socius*) of Africa. Many birds, such as Bee-eaters, and some Parrots, are burrowers, and these do not line

their nests as a rule ; the burrowing is effected by picking with the bill and scraping with the feet.

Many birds are parasitic, getting their eggs hatched and reared by others, the most familiar instance of this being the European Cuckoo. Not more than half the known Cuckoos have this habit, but it is found again in the Honeyguides and in some of the American Troupials, notably the well-known Cowbird (*Molobrus pecoris*) of North America, and its southern allies.

Polygamy is usually confined to the Game-Birds, and in such cases the female undertakes the entire charge of the eggs and young. Polyandry appears in several cases where the male undertakes family duties, as in the Tinamous. In the Rhea the instinct seems to be in a fluctuating state in this respect. The male fights his rivals and guards the hens, of which he will secure several. Yet he sits on the eggs and cares for the young, and the female in captivity will often pair with another male. As a general rule, where the male undertakes the sitting and rearing, the character of the sexes is reversed, the female being bolder and more pugnacious, and even larger and more brightly coloured, though she is never so far superior to the male in appearance as male birds often are to females. In a very large number of cases the sexes of birds are practically exactly alike, as in the ordinary Pigeons.

Close examination, however, generally shows that the male is slightly larger and longer-headed and billed in such cases. The New Zealand Huia (*Heteralocha acutirostris*), a black jay-like bird allied to Starlings, offers a very curious case, the male having a bill much like a Woodpecker's, while the female's is long, thin, and curved ; they hunt rotten wood for insects in couples, the male pecking, and the female probing, for prey. The great superiority of appearance in the male is, of course, a familiar fact in many cases ; it being so well known in the Fowl and Common

Duck. In such cases the young generally follow the plumage of the adult female. Often, however, whether the sexes are alike or different, the young have a separate first plumage of their own, as in the case of the young Robin, which is spotted. In a few cases the young, as in the Upland Goose of South America (*Chloephaga magellanica*), show the sex-difference in their first feathering.

A seasonal change of colour to a greater or a less extent is not uncommon in birds. It may affect only the special plumage of the male, as in the case of the Common Drake, which loses its distinctive hues in summer. Or it may affect both sexes, as in the well-known change of the Ptarmigan to white in winter. Such changes occur amongst tropical birds as well as among those of temperate regions, so that it must not be put down as necessarily an adaptation to a severe winter.

Considering their powers of flight, it is not surprising that birds are to be found all over the world, even on the remotest islands; the Emperor Penguin breeding even on the Antarctic ice. In the highest latitudes the species, however, mostly draw their sustenance from the sea, either directly or indirectly, and very few remain during the winter.

In temperate regions also there is a great migratory movement towards the warmer climates in autumn, and back again to the breeding places in spring. The motive for migration from a temperate climate is obvious enough, food in such zones being scarce during the winter season. The return journey in the spring is less easily explained, but is probably partly due to the strong attachment of birds to their home or nesting site, and partly also in all probability to persecution by the permanent residents in their winter quarters. In the tropics there is a great deal of local migration in relation to the rains; aquatic and fish-eating species,

for instance, seeking flooded districts, others migrating to avoid a damp climate.

Mere temperature—heat or cold—seems to affect birds but little, provided there is not excessive damp and that the food is abundant. This is shown by the ease with which tropical birds can be kept in the open in temperate countries, while, conversely, birds from temperate regions will often live well in the tropics, though there are exceptions in both cases.

The range in some species of birds is very wide, especially among birds of prey and aquatic species. Our Barn Owl, Peregrine Falcon, and Cormorant, for instance, are found nearly all over the globe, and the Turnstone, except in the breeding season, practically everywhere.

A most remarkable distribution is that of the Fulvous Tree-duck (*Dendrocycna fulva*), a member of a tropical, non-migratory group of water-fowl, which is, notwithstanding, found in Africa, India and tropical America. Several families of non-migratory birds, it may be mentioned, have this distribution, that is to say, all round the world in hot climates. Some tropical families also may be noted to send forth outlying forms into temperate regions; such are the Cuckoos, Parrots, and Kingfishers, of which a few species may be found in temperate climates, though most are tropical.

The bird with the most limited numbers of any is probably the Narcondam Hornbill (*Rhytidoceros narcondami*), which is confined to the Island of Narcondam, a small wooded hill rising out of the Bay of Bengal, only about three square miles in area, and estimated to hold two hundred of these birds. Birds with a limited habitat like this are, of course, particularly liable to extermination if any change in condition occurs. Ground-living species in such places have often lost the power of flight, and hence soon fall victims to such animals as cats, rats, and pigs, which accompany man.

Nowadays where species of limited range are to be found, the half-educated ornithologist is too often their worst enemy, from his mistaken zeal in "accumulating liberal series" for Museums.

In birds of wide range, considerable differences are often noticed between examples from different localities, though, as these differences are not constant, they do not constitute a specific distinction. Such local differences constitute what are known as local races; thus the large Siberian Goldfinches, commonly imported into England in winter by dealers, are easily distinguishable from our own birds, but connecting links are easily found in Continental specimens.

The world is divided ornithologically into several great regions characterized by the birds occurring there.

The Palæarctic region includes the northern part of the Old World. The Divers, Auks, and Grouse are confined to this region, and it is the chief breeding-ground of many groups, such as Warblers and Sandpipers, which often spend the winter much farther south of it. Thrushes, Tits, and Finches are also partly characteristic birds of this region, but are likewise found over the whole world generally.

The Nearctic region consists of North America, and exhibits much the same characteristic types as the above, with a mixture of South American forms; but, as most of these are migratory, it is hardly justifiable to keep the regions separate, and the two combined are often known as the Holarctic region.

The Ethiopian region includes Africa south of the Sahara, the country north of which belongs to the Palæarctic region. This contains many peculiar and characteristic forms, Mouse Birds, Touracous, Wood Hoopoes, Guinea Fowls, and especially the Ostrich, while Weaver Birds, Francolins, and Hornbills are highly characteristic of it, although not confined thereto, occurring also in the next region.

The Oriental, or Indian, region embraces Asia south of the Himalayas, the boundaries of the Palæarctic region, and the East Indian islands down to Bali. Broad-bills are the only important group confined to this region, but the Pheasants, Babblers and Sun-birds are partly characteristic of it. It might perhaps be advantageously united to the Ethiopian region, as there is evidence that more types were once common to both, as is shown by the fossil remains of African mammals occurring in the Siwalik Hills.

The Australian region begins at Lombok, only separated by a narrow strait from Bali in the Indian region, and includes all the East Indies east of this, Australia, New Zealand, New Guinea, and the Pacific Islands. It has more peculiar forms than any other of the foregoing regions; for instance, the Cassowaries, Lories, Lyre-birds, Birds of Paradise, Bower-birds, and almost all the Honey-eaters, Cockatoos and Mound-birds. In the case of each of the last three, one species only occurs outside of the limits. At the same time, many other widely distributed families are absent from this region, especially Woodpeckers, Vultures, and typical Finches.

The Neotropical region consists of South America and the countries north of it up to Mexico. This, also, is a very distinct region containing many peculiar forms —Rheas, Tinamous, Trumpeters, Curassows, Jaçamars, Puff-birds, Motmots, Toucans, and sub-groups of the Passerine family too numerous to mention here, besides most of the Tanagers, Troupials and Humming Birds, though some of these penetrate into North America.

Quite a number of birds, generally European, have been naturalized in other countries than their own, either for the sake of sport, as in the case of Game Birds, or in the hope that they would be useful as insect-destroyers, or simply on sentimental grounds. It is unfortunately the case that some of the most successful

of the introduced species have not been desirable ones, such as the ordinary House Sparrow, which is now found through introduction over most of the world. On the other hand, some have proved very useful and inoffensive; for instance, the European Goldfinch, and against these there is nothing to be said. The idea that introduced birds necessarily tend to cause the extinction of the original fauna appears to be a mistake. The native birds which disappear are mostly those which are dependent on the indigenous forests for their existence; while the introduced forms will thrive in the neighbourhood of man, as he naturally selects such birds as he is accustomed to see, such as the House Mynah (*Acridotheres tristis*) of India, as well as the Sparrow. The possibility of some species in newly-settled countries becoming seriously reduced by disease communicated by introduced birds is well worthy of consideration, but this can hardly be avoided, considering that poultry and pigeons can hardly be dispensed with by colonists. The best birds to acclimatize are those which are considered good for food or those whose showy appearance assures a demand as cage-birds, with the exception of the Parrots, whose extreme destructiveness puts them out of court altogether.

Considering the beauty and interest of birds, it is fortunate that they are, on the whole, such desirable animals from the economic point of view. Hardly any are actually dangerous, and comparatively few injurious to crops or domestic animals, while the majority do a great deal of good by the destruction of vermin and seeds of weeds, and sometimes by scavenging. Almost all are edible, and some of them furnish some of the best and most easily available animal food.

The use of their feathers as ornaments is to my mind illegitimate, and ought to be forbidden, except in the case of those species which are reared in domestication, though it must be admitted that no species ever

appears to have been exterminated by this practice. Still, the havoc wrought is immense, and all the more deplorable as it affects the most beautiful species.

The depredations of collectors on locally rare species can be easily checked by making the destruction of all birds illegal, except such species as may be found to be locally too numerous and destructive. Such measures have been proposed, but some so-called ornithologists will, no doubt, be found to be in opposition, for although they are against the killing of birds by others, yet they reserve to themselves the right of killing as many as they please; and now that it is the fashion to collect large numbers of specimens to exemplify local variation, and to take the whole batch of eggs out of a nest, an ignorant ornithologist may do a considerable amount of harm in studying what he mistakenly thinks is science.

As a matter of fact, it is a far more scientific proceeding to study birds in life, and if a rare visitor, or casual variety, be spared, and given a chance to breed, there is some chance of recording scientific facts of really wide interest. The claim that all rare visitants have "gone astray in migration" and "would never remain to breed" is a mistaken one, since some birds are even now known to be extending their range, and some must have continually been so doing through all past ages.

In this connection the importance of the study of living birds in captivity deserves mention, as many important facts have been ascertained thereby, and a great many more might be added. Birds are usually best kept in aviaries, but most will thrive well even in cages if given plenty of space, kept scrupulously clean, and well fed. The feeding of seed-eaters and carnivorous birds with their natural food is easy, and fruit-eaters will readily accept cooked vegetables and boiled rice, bread and milk, etc., as a substitute for fruit; but insect-

eaters cause more trouble, and the small kinds, at all events, cannot be kept long without a good supply of insects either fresh or dried. Meal-worms and such dried insects as "dried flies" and "dried ants' eggs" (really the cocoons) are readily obtainable in Europe, and should be taken abroad by anyone intending to try to bring home insectivorous birds. Bread and milk, however, and raw meat or hard-boiled egg minced fine and mixed with stale bread-crumbs, will keep them for some time, and the more omnivorous kinds will live on this indefinitely. Honey-eating birds will live on condensed milk suitably diluted. As will be seen, there are very few families of which some species or other has not been kept in captivity, and the number of those which have been bred in that state is constantly increasing, to the great advancement of ornithological knowledge and of biology generally.

The classification of birds has long been regarded as a subject of great difficulty, owing to the close interrelationship of so many of the numerous families, and hence the various standard works on birds present the greatest divergence as to the numbers of "orders" under which these families are grouped, and in some one case writer will put a family under a different order from that in which it is placed by another. Thus much confusion arises; but the families themselves are at any rate natural assemblages, and easily recognisable by external as well as internal characters. The number of them in this book may, no doubt, be reduced by future writers, as in some cases what are here ranked, according to custom, as separate families, would be better united. Thus, the Pelicans, Gannets and Cormorants might well go all in one family, along with the Frigate and Tropic-birds, while the Toucans and Barbets might also be classed together, and so forth, no doubt, in some other cases.

THE WORLD'S BIRDS.

American Vultures (*Cathartidæ*).

Diagnosis.—*Vulture-like birds of prey, with pervious nostrils and all front toes webbed at base.*

Size.—From that of a fowl to larger than a swan.

Form.—*Bill* moderate or short, strongly hooked, with no internal division between nostrils, and corner of mouth high and terminating before eye; *feet* with hind-toe so short as to be useless, and all front toes webbed at base. *Wings* large, blunt; *tail* usually short. Eyebrows not prominent as in other birds of prey, and thighs closely feathered, not clad in long plumes.

Plumage and Colouration.—Feathering sombre and uniform, generally black; no sexual difference in colour or seasonal change, but young often unlike adults. Head always bare of feathers.

Young.—Helpless and clad in white down.

Nest.—Usually none; the eggs being laid on the bare ground or on rocks, or in a hollow tree.

Eggs.—One or two; pale-coloured, uniform or spotted.

Incubation.—From about a month to nearly eight weeks (Condor).

Courtship.—In the Black Vulture (*Catharistes atratus*) the male erects and expands his wings.

FOOD.—Carrion, and any animals weak enough to be overcome without trouble or danger.

GAIT.—A sedate walk. They perch freely.

FLIGHT.—In most species by sailing, like the Old World Vultures; but the small Black Vulture flaps and sails alternately, like an ibis.

NOTE.—A hiss only.

DISPOSITION AND HABITS.—They are, like Old World Vultures, sociable, but cowardly and quarrelsome. They seem never to bathe, and always have dirty feet, like some storks.

ECONOMIC QUALITIES.—They are useful scavengers, but the Condor is often injurious to young cattle and sheep. Its quills are valued as ornaments.

CAPTIVITY.—They thrive well in this condition, and the Condor and Black Vulture have laid eggs in the London Zoological Gardens.

DISTRIBUTION AND IMPORTANT SPECIES.—The species of this family, seven in number, are confined to America. The best known in menageries is the celebrated Condor (*Sarcorhamphus gryphus*) of the Andes, one of the largest of flying birds, and unique in this family in showing a sexual difference —the possession of a comb and dewlap by the male; but the most familiar is probably the small Black Vulture (*Catharistes atratus*), a well-known town scavenger in hot regions in America, where it is commonly called "Carrion Crow." The Turkey-buzzard (*Cathartes aura*), black with pink head and feet, has the widest range, however. The Californian Vulture (*C. californianus*), very similar to the Turkey-buzzard, but with orange head and as big as the Condor, is nearly extinct. The King-Vulture (*Gyparchus papa*), of South America, which exerts authority over the Black Vulture, is mainly cream-colour, with an orange nasal wattle and black quills and tail.

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American Black Vulture (*Catharistes atratus*). (*See p.* 1.)

This is the bird commonly called "Carrion Crow" in the warm parts of America. It is about as large as a Raven.

[*To face p.* 2.

Photo copyright by W. P. Dando, F.Z.S.

Denham's Bustard (*Eupodotis denhami*). (*See p.* 9.)

The pose here is very characteristic of Bustards; the species is a West African one.

Auks (*Alcidæ*).

Diagnosis.—*Diving sea-fowl, with simple nostrils and three webbed toes ; no hind-toe.*

Size.—From that of a small goose to that of a lark.

Form.—*Bill* variously formed, corner of mouth extending to below eye ; *feet* with short shanks and three fully webbed front toes ; *wings* short and narrow ; *tail* short. Neck of medium length, body stout and heavy.

Plumage and Colouration.—Dark above, white below, or nearly all dark ; no sexual difference, but usually a seasonal change. The Puffins shed the outer sheath of the bill after breeding.

Young.—Downy and active, but fed by the parents ; down not streaked or spotted ; first plumage like the winter dress of adults.

Nest.—None, the eggs being laid on a rock-ledge or in a hole.

Eggs.—One or two only; large, more or less conical, spotted.

Incubation.—About a month, or even longer.

Courtship.—In the Guillemot the male rises in the water and swells his throat.

Food.—Marine animals, fish, crustacea, etc.

Gait.—On land an awkward waddle ; they sit erect, and hobble on the hocks in some cases (Common Guillemot), but not usually. They are fine swimmers, especially below the surface, where they use the half-closed wings for propulsion, not the feet.

Flight.—Heavy and straight, performed by constant rapid beats of the wings.

Note.—A croak or whistle.

Disposition and Habits.—They seem to be stupid and quarrelsome. They are, however, sociable.

Economic Qualities.—Their flesh and eggs are used for food in default of better fowl.

Captivity.—They are seldom kept, and do not do very well; but if given natural treatment, *i.e.*, plenty of swimming room and fish to eat, they can be maintained successfully. They have not bred in confinement.

Distribution and Important Species.—The birds of this family are entirely marine, but haunt seas of the Northern Hemisphere only, chiefly in high latitudes, and approaching land only to breed, which they always do gregariously. There are about two dozen species, most of which are found in the North Pacific. Familiar British forms are the Guillemot (*Uria troile*), Puffin (*Fratercula arctica*), and Razorbill (*Alca torda*). The extinct Great Auk (*Alca impennis*) was far the largest of the family, and the only flightless member of it, the wings being far too small for flight. The smallest is the Choochkie (*Simorhynchus pusillus*) of Alaska, a very common bird and an important article of food. The Little Auk, or Rotche (*Mergulus alle*), of the Arctic regions, is not much larger, about equalling a thrush; it visits Britain in winter. The Black Guillemot, or Dovekie (*Uria grylle*), is a familiar bird in the Arctic regions also. The most familiar Arctic form is, however, the Loom, or Brunnich's Guillemot (*Uria brunnichi*).

Barbets (*Capitonidæ*).

Diagnosis.—*Perching birds with toes in pairs, and stout beak of large but not excessive size.*

Size.—From that of a jay to that of a tit.

Form.—*Bill* short, stout, often bristled at the base,

corner of mouth under middle of the eye; *feet* with short shanks, and toes in pairs, the outer front one being turned back; *wings* short, rounded; *tail* short or medium, rounded or square. General build heavy; their carriage is stooping, sitting well over the perch.

PLUMAGE, ETC.—Predominant colour green, diversified with red, yellow, blue, and black; but some forms have no green. No seasonal change and usually no sex-difference; young much like adults, but less brilliant.

YOUNG.—Naked and helpless. When fledging they turn their tails over their backs under the wings. They shuffle about on the hocks, where there is a warty pad.

NEST.—A hole in a tree, pecked out by the birds.

EGGS.—Several; white.

FOOD.—Chiefly vegetable, berries especially. Some, especially the American and African kinds, however, eat insects also.

GAIT.—They usually hop about the boughs, seldom coming to the earth naturally. On the ground they hop. Some climb like woodpeckers.

FLIGHT.—Undulating and not long protracted; they are not migratory. The feet are drawn up in front.

NOTE.—Constantly reiterated, and often metallic in character. They are much more heard than seen.

DISPOSITION, HABITS, ETC.—They are usually solitary and rather quarrelsome, biting hard—at any rate Indian species; but some African species seem more sociable.

ECONOMIC QUALITIES.—Indifferent, their chief food being wild fruit. They are very ornamental birds, however.

CAPTIVITY.—They do well, feeding on "soft food," fruit, etc. Only one species, however, the Blue-throated

Barbet of Eastern Asia (*Cyanops asiatica*) is at all well known as a cage-bird. This has laid eggs in an aviary in England. It is about the size of a thrush, green with red cap, as well as blue throat.

DISTRIBUTION AND IMPORTANT SPECIES.—Warm regions all round the globe, except the Australian region. There are about a hundred species altogether. In India the most familiar is the Coppersmith (*Xantholæma hæmatocephala*), a small bird about as large as a sparrow, green with red-and-yellow head and red feet; it has its name from its metallic note, like the Tinker (*Barbatula pusilla*), a very small black, yellow, and white species, with red cap, found in South Africa.

BEE-EATERS (*Meropidæ*).

DIAGNOSIS.—*Perching birds, with long, thin, downwardly-curved bills and short feet with four toes, the three front ones more or less united.*

SIZE.—From that of a dove to that of a swallow.

FORM.—*Bill* long, thin, curved downwards, corner of mouth below eye; *feet* with very short shanks, three front toes more or less united, hind-toe smallest; *wings* usually long, sometimes medium or short; *tail* rather long, square, or slightly forked, usually with middle pair of feathers much the longest.

PLUMAGE.—Brilliant, usually showing much bright green; blue, red and yellow are also common. No seasonal change or sexual difference, and young not very different from parents.

YOUNG.—Naked and helpless, fed by the parents.

NEST.—A burrow made in the ground, usually in a bank or cliff, by the birds themselves.

EGGS.—Several, roundish, pure glossy white.

FOOD.—Insects, usually captured on the wing; especially bees and wasps. The indigestible parts are cast up in pellets.

GAIT.—They move about very little, usually sitting quiet on a perch; on the ground they have a shuffling walk.

FLIGHT.—Very graceful and easy, swift, with frequent intervals of sailing.

DISPOSITION, HABITS, ETC.—They are sociable and lively birds. They dust themselves, and bathe by splashing into water.

NOTE.—A chirp or whistle.

ECONOMIC QUALITIES.—They are destructive where bees are kept, but elsewhere are very useful, and are some of the most ornamental birds in existence.

CAPTIVITY.—They will live in confinement, but need a great deal of care, and have not bred. The Common Bee-eater (*Merops apiaster*) is the only species which has been kept in England.

DISTRIBUTION AND IMPORTANT SPECIES.—The species of Bee-eaters, of which there are about three dozen, inhabit the warmer parts of the Old World; one occasionally visits England, the Common Bee-eater (*Merops apiaster*), of Southern Europe, a migratory species; the small Green Bee-eater (*M. viridis*), is one of the most familiar birds in India, and is there commonly called "Flycatcher." It is the most widely spread of the family, ranging from North-East Africa to Cochin China. The large red species *Merops nubicus* is well known in Africa, and locally called "Fire-bird."

Bustards (*Otididæ*).

Diagnosis.—*Large tall ground-birds, with long neck, short bill, and three very short toes only.*

Size.—From that of a pheasant to larger than a swan.

Form.—*Bill* short, somewhat fowl- or pigeon-like in shape, with corner of mouth coming below eye; *feet* with shanks medium or long, no hind-toe, the very short front toes slightly webbed at the base; *wings* large and broad; *tail* short, often carried raised and folded as in a common fowl; *head* small, neck long, body broad and heavy-looking, with very flat back, carried horizontally.

Plumage, Colouration, etc.—General colour light-brown, more or less strongly pencilled with black, and varied with white; down at base of feathers pink; males often mostly black in breeding season. Ornamental plumes about head and neck are common. The fledged young resemble the adult females. The female is in some species larger than the male, but usually much smaller.

Young.—Downy and active, with mottled protective colouration.

Nest.—None, the eggs being laid on the bare ground.

Eggs.—Two to five; spotted on a greenish or brownish ground.

Incubation.—About a month in the Great Bustard.

Courtship.—Very elaborate, and varied according to species; the males often distend the throat to a remarkable extent.

Food.—Herbage and insects, etc., but not grain. They rarely drink.

Gait.—A walk or a very quick run.

Flight.—Heavy and powerful, performed by continued flappings, slow in the large species and more rapid in the smaller. Some of the latter play about on the wing.

DISPOSITION AND HABITS.—Nervous, but at times aggressive in the case of large males. They do not bathe, but dust themselves. They are very wary.

NOTE.—A croak, cackle, or boom.

ECONOMIC QUALITIES.—Some occasionally injure crops, but as a rule they are beneficial, and are most excellent sporting birds, being hard to bag and good eating.

CAPTIVITY.—They are not often kept, and their nervousness gives trouble. They have not bred. The European Great Bustard (*Otis tarda*) has done best in captivity, and has laid.

DISTRIBUTION AND IMPORTANT SPECIES.—The Bustards number about thirty species, inhabiting temperate and warm parts of the Old World, usually in dry open country. Most of the species are African, and there are none between India and Australia—yet the Great Indian Bustard (*Eupodotis edwardsi*) and the one Australian species (*E. australis*) are almost identical; the latter bird is known in its own country as the "Plains Turkey." The Paauw (*Eupodotis kori*), the largest flying bird, is also a South African Bustard of this group. The Florican (*Houbaropsis bengalensis*) is a well-known species, in which the male is black on the head, neck and lower parts; and the Knorhaan (*Compsotis afra*), in which the male is also largely black, is a well-known African species.

Çariamas (*Cariamidæ*).

Diagnosis.—*Long-legged birds, with short curved bill, short wings, and long tail.*

Size.—About that of a common heron or rather less.

Form.—*Bill* short, curved, with basal nostrils and corner of mouth below front of eye; *legs* long, bare above hock, with three short toes, webbed at the base, in front, and a very short, elevated, useless hind-toe; *wings* short and rounded, *tail* long and rounded.

Plumage, etc.—Loose and soft, finely pencilled, grey or brown in colour, wing-primaries conspicuously banded. No sex-difference, young like adults.

Young.—Hatched downy, the down being variegated.

Nest.—Open, in a tree or low bush, or on the ground.

Eggs.—Two; pale, with reddish spots.

Courtship.—In the Common Çariama, said to be like that of a bustard.

Food.—Chiefly animal—insects, mice, etc., with some berries. In feeding, they hold a large object down with one foot while tearing it. They kill prey by seizing it with the bill and dashing it down.

Gait.—A walk; they can also run rapidly.

Flight.—Not long sustained. They seldom fly except up to a perch.

Note.—A repeated scream, uttered with the head thrown back.

Disposition and Habits.—They are courageous and become very tame. They do not bathe, but dust themselves, and have a curious habit of lying over on the side or even back, like quadrupeds. Although spending most of their time on the ground, they roost on a perch at night.

Economic Qualities.—They are useful vermin-destroyers.

Captivity.—They do well in captivity, feeding on raw

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Common Cariama (*Cariama cristata*). (*See p.* 11.)

The curious erect crest is not found in the Chunga, the only other species.

[*To face p.* 10.

Photo copyright by W. P. Dando, F.Z.S.

Emu (*Dromæus novæ hollandiæ*). (*See p.* 12.)

The wings, as the photo shows, are so inconspicuous that the bird seems as if it had none.

meat, etc. They have laid and hatched young in the London Zoological Gardens.

DISTRIBUTION.—South America. Two species only, the Common Çariama (*Cariama cristata*), of Brazil and Paraguay, brown, with red bill and legs, and the Chunga, or Burmeister's Çariama, of Argentina (*Chunga burmeisteri*), smaller and greyer, with bill and legs black.

CASSOWARIES (*Casuariidæ*).

DIAGNOSIS.—*Large running flightless birds, with three toes and very small wings.*

SIZE.—About five feet high, and six in length. Not very much variation.

FORM.—*Bill* short, with central nostrils and gape to beneath centre of eye; *feet* with shanks stout, toes three, with no basal web; no hind-toe. *Wings* excessively small and useless, not flexed in the Emus, with one claw; in the Cassowary flexed at the elbow, fore-arm and hand directed downwards; *tail* well-plumed but inconspicuous.

PLUMAGE.—Very hairy-looking, being much decomposed and stiff-fibred, with the after-shaft as long as the main-shaft, making the feathers look double. Wing-quills wanting, or rudimentary. No sex-difference in colour, but the female larger.

YOUNG.—Active and feeding themselves; down hairy-looking, marked with numerous light and dark longitudinal stripes.

NEST.—A hollow on the ground.

EGGS.—Numerous; green — dark in Emu, light in Cassowaries — oval, with a peculiar granulated surface.

INCUBATION.—Seven to nine weeks, the male only sitting.

Food.—Chiefly vegetable, herbage, fruit, etc.

Gait.—A walk or run, often very rapid. They swim well and readily.

Note.—A boom or prolonged guttural sound.

Disposition and General Habits.—These birds are intelligent, and have considerable courage and inquisitiveness. The foot is used in fighting.

Economic Qualities.—There is not much to be said on this head ; the skins are useful as rugs.

Captivity.—The birds of this family do well in captivity ; they have bred, and Emus, at any rate, have reared their young frequently.

Distribution and Important Species.—The family falls into two sections—the Cassowaries proper, with a helmet on the bare head when adult, with spine-like (secondary) quills in the wing, and with the claw of the inner toe enlarged and spike-like. They are black when adult, chestnut in first plumage. They inhabit the Papuan Islands, except one found in North Australia, and live in forests ; there are about a dozen species, chiefly distinguished by the colours of the brilliant bare skin of the head and neck, which is generally produced into wattles. The best known is the Common Cassowary (*Casuarius galeatus*).

Emus have the head feathered with no helmet, and no spine-like secondary quills or enlargement of the inner claw. They inhabit open plains. Only one species, the speckled-grey Common Emu (*Dromaeus novæ-hollandiæ*) is living, and is well known in Australia. The Dwarf Black Emu (*D. peroni*), of Kangaroo Island, has, however, only become extinct within the last hundred years.

Cormorants (*Phalacrocoracidæ*).

Diagnosis.—*Diving-birds with all the four toes webbed and moderate wings.*

Size.—From that of a goose to that of a jackdaw.

Form.—*Bill*, medium to short, with the tip hooked, except in the Darters, covering divided by grooves, nostrils nearly obsolete; *feet* with short laterally flattened shanks, and all four toes webbed, the first pointing backwards as usual, and not forwards as often stated; *wings* moderate; *tail* moderate or long. Neck and body long, thighs prominent.

Plumage and Colouration.—Feathering peculiarly short on the lower back, usually mostly black or black-and-white, in the adults, and brown in the young; hardly ever a sexual difference, but usually some seasonal change. Face always bare.

Young.—Helpless and naked at first, then clothed with down, except the front of the head, which remains bare; down black in Cormorants, white in Darters. They fledge evenly, like other nestlings. When being fed they thrust their heads down the parents' throats.

Nest.—A collection of sticks, weed, etc., placed on rocks, trees, reeds, or the ground.

Eggs.—Several; pale blue or green, overlaid by a white chalky coating.

Incubation.—About a month.

Courtship.—In the case of the Common Cormorant, the male bends down his bill, expands his throat, half opens his wings, and hops about the female.

Food.—Fish and other aquatic animals obtained by diving.

Gait.—A walk, not so awkward as often represented. Cormorants stand and move semi-erect, but Darters walk with the body horizontal. Most perch freely, and jump about among boughs with con-

siderable ease. In the water they swim low, with the tail awash, the Darters only showing head and neck; they dive most excellently.

FLIGHT.—Direct and powerful, much like a duck's, but with some sailing intervals; in starting off the water they rise heavily and strike it with both feet together, not running on it like some ducks. Cormorants extend the whole neck in flight; Darters carry it semi-retracted; both extend the feet.

NOTE.—Harsh and croaking; but they are not noisy birds.

DISPOSITION AND HABITS.—They are rather sociable when breeding, but quarrelsome; fierce, wary and intelligent; they spend little time in the water when not fishing, and are fond of sitting perched with outspread wings when first leaving it.

ECONOMIC QUALITIES.—Cormorants are destructive where the fresh-water fish are of value; they have locally some value as articles of food and guano-producers.

CAPTIVITY.—Cormorants are easily kept, and the common European species (*Phalacrocorax carbo*) has bred; in China it is domesticated, being regularly bred, the young reared by hand after hatching under hens, and trained to catch fish as a source of profit.

DISTRIBUTION AND IMPORTANT SPECIES.—There are three dozen species of Cormorants and three of the very long-necked straight-billed Darters (*Plotus*). The latter are confined to warm climates; one inhabits Africa and Asia Minor, one Southern Asia, one Australia, and one tropical America. The first three are all much alike, and the Indian species is well known as "Snake-bird"; the American, among other differences, has a pale tip to the tail. All are arboreal fresh-water birds.

The distribution of the Cormorants is almost world-wide, but is very curious. Our familiar species is found almost everywhere and breeds in any climate. The common Cormorant of the warm parts of Asia is the smallest of all, the black *Phalacrocorax javanicus*, a fresh-water bird. New Zealand has no less than fifteen species, sea and inland, in spite of a very limited variety of fresh-water fish. In this colony the birds are called Shags. Much of South America, on the other hand, in spite of the great water area and fish-supply, has only the one kind, *P. vigua*.

Coursers (*Glareolidæ*).

Diagnosis.—*Plover-like birds, with corner of mouth extending back beyond forehead, and two outer toes only webbed at the base.*

Size.—From that of a dove to that of a thrush.

Form.—*Bill* short, generally curved in profile, with corner of mouth half-way to eye; *feet* with moderate or long shanks, two outer front toes with a short web at the base, the claw of middle toe toothed on the inside; hind-toe small or wanting. *Wings* moderate or very long; *tail* short or long. *Head* rather large, and general appearance plover-like.

Plumage and Colouration.—Colour much as in many plovers, brown, drab, or grey, with white below; wing-lining often conspicuously contrasted. No sex-difference or seasonal change; young mottled with buff in first plumage.

Young.—Active and downy, the down finely speckled.

Nest.—A mere "scrape" on the ground.

Eggs.—Three; spotted as in plovers, but more oval and less pear-shaped.

Incubation.—About three weeks.

FOOD.—Insects, etc.

GAIT.—A walk or run.

FLIGHT.—Rapid and easy in Coursers, much as in plovers; in Pratincoles slow, but graceful and active, as in terns or small gulls.

NOTE.—Harsh and rattling.

DISPOSITION AND GENERAL HABITS.—The Coursers are solitary ground-birds; the Pratincoles are social, and catch most of their food on the wing, like swallows, which they resemble in general form, except for the feet, whence the name "Swallow-plovers" often applied to them.

ECONOMIC QUALITIES.—They are valuable insect-destroyers, especially the Pratincoles, which are much esteemed at the Cape for their services in eating locusts, these insects being systematically pursued by them, whence they are called "Locust-birds."

CAPTIVITY.—A few of both groups have been kept, and the Common Pratincole (*Glareola pratincola*) has hatched young in the London Zoological Gardens.

DISTRIBUTION AND IMPORTANT SPECIES.—These birds, numbering about two dozen species, inhabit the warm and temperate regions of the Old World, the northern ones migrating south in winter. The Cream-coloured Courser (*Cursorius isabellinus*) of the Mediterranean region ranges east to India, and has occurred in England, as has the Common Pratincole (*Glareola pratincola*). The Black-backed Courser (*Pluvianus ægyptius*) is the celebrated *trochilus* of Herodotus, who was the first to record its friendship with the crocodile, the mouth of which reptile it is said to free of leeches.

Crocodile-bird (*Pluvianus ægyptius*). (*See p.* 16.)

This Courser (*Pluvianus ægyptius*) is very delicately coloured, French grey above and buff below, with white eyebrows.

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Hen Purple Sugar-bird (*Cœreba cœrulea*). (*See p.* 114.)

In the position of repose shown in this photograph the characteristic slim shape is of course not noticeable. [*To face p.* 16.

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Common Pratincole (*Glareola pratincola*). (*See p.* 16.)

The above photograph represents the species occurring in Europe (*Glareola pratincola*). Its colour is chiefly brown above and white below. The black throat-band is a characteristic marking of Pratincoles generally.

Crab-Plover (*Dromadidæ*).

Diagnosis.—*A pied plover-like bird, with crow-like bill and half-webbed feet.*

Size.—About that of a crow, but higher on the legs.

Form.—*Bill* straight, stout, of medium length, corner of mouth reaching half-way to eye; *feet* with long shanks, three front toes webbed half-way from base, hind-toe fairly developed, touching the ground at tip. Head large, neck medium; *wings* medium and pointed; *tail* short.

Plumage.—Pied black and white, the latter colour predominating; sexes alike, young distinguished by grey backs and streaked heads.

Young.—Active; they are covered with greyish down, and are believed to stay in their holes all day, and come to feed at night.

Nest.—A burrow dug in the sand of the seashore, curving up towards the end.

Eggs.—One, white in colour, and very large for the size of the bird (about two and a half inches).

Food.—Small shore-animals, especially crabs; large ones are broken up by the bird.

Gait.—A walk or run like other plovers; it often wades.

Flight.—As in most plovers, by rapid beats of the wing.

Note.—A low and rather musical call.

Habits.—Haunts the seashore and salt lakes, usually in flocks.

Captivity.—This bird has never been kept in captivity, so far as I know.

Distribution.—The single known species (*Dromas ardeola*) inhabits the shores of the Eastern seas from Aden to the Andamans.

Cranes (*Gruidæ*).

Diagnosis.—*Very tall ground and marsh birds, with nostrils in centre of bill and small useless hind-toe.*

Size.—From the size of a heron to about five feet high.

Form.—*Bill* straight, medium to long, with nostrils situated about in the centre; corner of mouth below forehead; thighs bare above hocks; *feet* with long shanks and three toes in front, the two outer with a short web at the base, the hinder small, useless, not reaching the ground; *wings* large and broad, inner secondaries long or very long, covering primaries and tail in repose; *tail* short and square. Head small, neck long, body light.

Plumage and Colouration.—Close and often powdery, showing generally only grey, black, and white in large masses. No seasonal change or sexual difference, but fledged young much browner than adults, and with down where these, as usually is the case, have naked skin on head.

Young.—Active, but at first taking food from the bills of the parents; clad in uniform cinnamon-coloured fluffy down. The young Stanley Crane (*Anthropoides paradisea*) has grey down.

Eggs.—Two or three; usually pale, with dark blotches.

Nest.—A mass of rushes, etc., on the ground or piled up in shallow water.

Incubation.—About a month.

Courtship.—Very elaborate, performed by dancing, bowing, and posturing with expanded wings. Some can also raise the inner quills in the closed wings.

Food.—Herbage, roots, and grain, supplemented by insects and other small life.

GAIT.—Usually a slow, dignified walk, but they can run fairly well. Few species perch—only the Crowned Cranes (*Balearica*). They can swim on occasion, and are fond of wading.

FLIGHT.—Heavy, but powerful; they soar with ease and do this for pleasure. They keep both neck and legs extended in flight.

NOTE.—A loud trumpeting, or hollow booming or hooting.

DISPOSITION AND HABITS.—Playful and sociable; but they separate into pairs in the breeding season and are then often savage. They are highly wary and very intelligent, and very active, unlike herons.

ECONOMIC QUALITIES.—Most are very destructive to corn and other crops, but are also good eating. Being hard to get near, they are considered good sporting birds.

CAPTIVITY.—They thrive admirably, and some have bred, the Manchurian Crane (*Grus japonensis*) and Demoiselle (*Anthropoides virgo*) being the most inclined to breed in captivity.

DISTRIBUTION AND IMPORTANT SPECIES.—Cranes are found in most of the Old World and North America, the northern species going south in winter. They are only found in open country and usually near water. There are only about sixteen species. The best-known generally is probably the above-mentioned East Asiatic Manchurian Crane, as it is such a favourite in Japanese art; it is one of the largest species, white with black wing-plumes, grey neck and bare red crown. The Common Crane of Europe and Asia (*Grus grus*) is a bird of similar type, but much smaller and nearly all grey. The American Sand-hill Crane (*G. canadensis*) is also a grey bird of medium size for a Crane, with the head bare

and red down to the eyes, but short wing-plumes. The Australian Crane or Native Companion (*Antigone australasiana*) is grey, with a red bare head, and of large size, with dark legs, while the Indian Sarus (*Antigone collaris*), coloured in much the same way, has the upper neck bare as well as the head, and pink legs, while larger than the Manchurian.

The Crowned Cranes (*Balearica*) are African, both distinguished by the plush-like black frontal tuft and full crest of yellow bristles; the southern kind (*B. regulorum*) being much paler grey than the northern (*B. pavonina*).

Cuckoos (*Cuculidæ*).

Diagnosis.—*Tree-birds, with pair-toed feet, the front toes with a short web at the base; and bill with the nostrils placed close to the edge of upper jaw.*

Size.—From that of a sparrow to that of a raven.

Form.—*Bill* of moderate length, but varying in thickness, generally curved in profile, with nostril nearer edge of jaw than ridge, and corner of mouth below eye; *feet* with short or medium shanks, with four toes, fourth turned back as well as first, the two front toes webbed at the base; *wings* short to long; *tail* usually long and rounded.

Plumage and Colouration.—Colouring variable, but seldom brilliant; often much like that of birds of prey, with long thigh-plumes like these; sexes usually alike, but young generally very different; no seasonal change. Feathering in Bush-Cuckoos often peculiarly coarse and "wiry."

Young.—Naked, or with very scanty hair-like down, and helpless; in parasitic forms they are, of course,

fed by the foster-parents, and often eject the young of these.

NEST.—In non-parasitic forms rather rough, composed of sticks, coarse grass, etc.; in some cases open, in others domed.

EGGS.—Several; varying in colour. In parasitic forms they often resemble those of the host, and are often spotted; in non-parasitic forms plain white or blue is the rule.

INCUBATION.—About a fortnight, in the common European Cuckoo.

FOOD.—Chiefly insects, or other small animals—a few feed chiefly or partially on fruit. They are remarkable for being able to devour what other birds usually refuse, such as hairy caterpillars and toads.

GAIT.—In the short-legged tree-haunting forms an awkward hop; in the strong-legged running kinds an active walk or run. All perch freely.

FLIGHT.—In the long-winged tree-haunting kinds swift and elegant, with rapid action of the wings; these often catch prey on the wing. In the short-winged kinds slow, heavy, and low, and not continued far. The feet are extended behind in flight.

NOTE.—Generally peculiar and characteristic, and often articulate in character, varying much in different species. Our bird is the only one which cries "cuckoo"; several have notes running up the scale.

DISPOSITION AND HABITS.—Cuckoos are usually greedy and unsocial birds, but probably have a good deal of intelligence; they are easily tamed.

ECONOMIC QUALITIES.—Their destruction of injurious insects, etc., makes them some of the most valuable and important of birds.

CAPTIVITY.—Only one species, the fruit-eating Koel (*Eudynamis honorata*), is commonly kept, and that

chiefly in India; but the Guira (*Guira guira*) of South America has even laid and hatched young in the London Zoological Gardens. They are easy enough to rear, but the parasitic forms are slow in learning to feed themselves.

Distribution and Important Species.—Cuckoos, of which there are about a hundred and sixty species, are found all over the world, but the great majority are tropical; those inhabiting temperate climates migrate south in autumn, and thus it comes to pass that our familiar species (*Cuculus canorus*) is at one time or another to be found over most of the Old World. There are two well-marked types in the family: first, the long-winged, short-legged Tree-Cuckoos, which are parasitic in the Old World; in the New World the species of this type are not parasitic; secondly, the short-winged, strong-legged Bush-Cuckoos, found in both worlds, but only in hot climates, and never parasitic in either hemisphere.

The best known of the latter group are the "Crow Pheasant" (*Centropus sinensis*) of India, a black bird of the size and shape of a magpie, with chestnut wings; the Guira, or "White Ani," of South America (*Guira guira*), pale streaky buff, with a white tail crossed by a black bar, and the celebrated "Road-runner" of Mexico and California, deep bronze-green, with white-edged plumage.

Of the Tree-Cuckoos, our own species is, of course, far the most familiar; but in India the above-mentioned Koel, black in the male and variegated in the female, and parasitic on crows, is very well-known, as also the "Brain-fever bird" (*Hierococcyx varius*), which, in both young and adult plumages, most closely resembles the Shikra or Indian sparrow-hawk (*Astur badius*); this parasitizes various babbling-thrushes. In North

By permission of the Oxford Museum.

Road-runner (*Geococcyex mexicanus*). (*See p.* 22.)

The speed of this ground-cuckoo is remarkable, as it can run ahead even of a horse for hundreds of yards, although not bigger than a magpie. [*To face p.* 22.

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Orton's Guan (*Penelope ortoni*). (*See p.* 24.)

Notice in this pheasant-like bird the long pigeon-like hind-toe which characterises Curassows and Guans.

America the Black-billed and Yellow-billed Cuckoos (*Coccyzus erythrophthalmus* and *C. americanus*) are familiar birds; they build open twig-nests and lay blue eggs, but, like our species, which they do not equal in size, eat hairy caterpillars. In colour they are light drab above and white below. In New Zealand there are two migratory species, the small bronze-green *Chalcococcyx lucidus* and the long-tailed *Urodynamis taitensis*, coloured something like a hen kestrel, which is beginning to parasitize the acclimatized English birds as well as native species.

Curassows (*Cracidæ*).

Diagnosis.—*Large fowl-like birds, with long flat tails, well developed hind-toe, and all front toes connected at base by web.*

Size.—From that of a hen turkey to that of a bantam.

Form.—*Bill* short, sometimes stout, often enlarged at base of forehead. *Feet* with medium shanks and four toes, the hinder well developed and set low, the front ones connected by webs at base, the claws curved. *Wings* short and rounded; *tail* long, rounded, flat, but with the feathers slightly arching horizontally. Head usually crested.

Plumage.—Generally dark, bronzed, brown, or black: Sometimes a sex-difference, the females in this case often barred; but no seasonal change. Young like adult females.

Young.—Active, and feeding themselves; with striped down at first; soon fledging, and following their parents in the trees.

Nest.—A platform of sticks in a tree; the male aids in construction.

Eggs.—Several; spotless white and rough-shelled.

INCUBATION.—About a month.

COURTSHIP.—The male leans his head back and raises his tail, but does not spread it.

FOOD.—Leaves, fruit, nuts, insects, etc. They feed partly in the trees, and partly on the ground, where they scratch like fowls.

GAIT.—A walk or run ; they are very active among the boughs.

FLIGHT.—Heavy and direct ; not protracted very far.

NOTE.—A whistle or cackle.

DISPOSITION AND HABITS.—Intelligent and wary ; decidedly inclined to be spiteful. They bite hard, besides striking with the feet.

ECONOMIC QUALITIES.—Their flesh is good eating, and they are therefore esteemed as game.

CAPTIVITY.—They do well, but seldom breed ; they are very tame nevertheless.

DISTRIBUTION AND IMPORTANT SPECIES.—The species of this family—about fifty—are found in warm parts of America only, in wooded country. There are three sub-families : the Curassows (*Cracinæ*), with stout bills, and all of large size ; the Derbian Curassow (*Oreophasinæ*), with medium bill and a stout horn on the forehead ; and the Guans (*Penelopinæ*), with slight bills and no protuberance thereon. The Curassows are often seen in captivity in menageries, and several are familiar, especially the Globose Curassow (*Crax alector*), black in the male, with a yellow knob on the bill ; brown in the female ; of the Guans one, the Chacalacca (*Ortalis vetula*), a drab bird of the size of a hen pheasant, is well known in Mexico and Texas. The family is closely allied to the game-birds.

Diurnal Birds of Prey (*Falconidæ*).

Diagnosis.—*Perching birds, with rather short hooked beaks with a cere at base, and the two outer front toes united by web at the base.*

Size.—From that of a sparrow to larger than a goose.

Form.—*Bill* medium or short, strongly hooked, often toothed at the tip, base softer and waxy-looking (the cere), corner of mouth reaching nearly or quite below eye; *feet* with shanks medium or short, often feathered; toes, three in front, the outer two usually united by a web at the base, one behind, all armed with strong claws, often very long and sharp; *wings* variable, short to very long, rounded or pointed; *tail* short to long, usually nearly square, but sometimes rounded, wedge-shaped, or forked. Head usually large and broad, neck generally short, body light, with legs and thighs prominent and clothed with long feathers.

Plumage and Colouration.—Plumage never brilliant, greys and browns predominating; many species marked with transverse bars in some parts; sexes seldom different in colour, though females are generally distinguishable by their superior size. No seasonal change, but young plumage generally different from that of adults.

Young.—Helpless, and fed by parents, clothed in fluffy down, which generally is pale—usually white—without markings.

Nest.—An open structure of sticks, placed on trees, rocks, or the ground. A few breed in holes in trees, etc.

Eggs.—One, two, or several; white or blotched with red.

Incubation.—Three to four weeks.

Courtship.—The male often gives the female food, but I have never seen any display.

FOOD.—Almost exclusively animal, the larger species preying more on vertebrates, the smaller more on insects. Many are carrion-feeders. They hold their prey in their feet when feeding, and cast pellets of bones, feathers, hair, etc.

GAIT.—A walk or run, usually rather awkward. They also hop at times, but this is not their ordinary gait.

FLIGHT.—Powerful, but varying in speed; there is usually great power of gliding or soaring, especially in carrion-feeders. They generally seize and carry their prey in their feet, which are stretched out behind in flight, the neck being drawn in.

NOTE.—Usually harsh, a yelp or scream, sometimes a whistle. They are noisy when pairing, but usually quiet at other times.

DISPOSITION AND HABITS.—They are more or less fierce, but many less so than might be supposed, being often inoffensive unless urged by hunger; but few are sociable; chiefly carrion- or insect-feeders.

ECONOMIC QUALITIES.—In spite of the bad name they have they are generally useful birds, by destroying vermin; the Goshawks and Sparrow-hawks (*Accipiter*, *Astur*) seem almost the only forms which are mainly noxious. Some are useful scavengers.

CAPTIVITY.—Almost all bear this well, and several are, and long have been, used in hunting; but they seldom breed in captivity. The chief species used in falconry are the Peregrine and Goshawk.

DISTRIBUTION AND IMPORTANT SPECIES.—Some or other of the species of this family, about four hundred and fifty in number, are found everywhere, many being migratory. Two main groups seem recognizable: the Vultures, always large, and usually bald or downy on top of the head, and with weaker hind-toes; these are confined

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Saker Falcon (*Falco sacer*). (*See p.* 27.)

This species retains through life the streaked breast which in so many Hawks becomes barred. [*To face p.* 26.

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Osprey (*Pandion haliaëtus*). (*See p.* 28.)

The Osprey is very simply coloured, its hues being dark brown and white, with the feet and cere pale blue or greenish.

to the Old World in temperate and tropical regions, but do not occur in Australia; and the true Eagles, Buzzards, Hawks, Falcons, etc., which cannot very well be divided into sub-divisions, and some or other of which may be found everywhere.

In dry regions in the Old World, the small white Scavenger Vultures (*Neophron percnopterus* and *N. ginginianus*)—two scarcely separable races—are the most familiar, haunting towns and villages. They are driven off from carcases by the large Griffons (*Gyps*) of various species and their allies. The black Bengal Vulture (*Pseudogyps bengalensis*) is the commonest of this type in India. The Lämmergeier, or Bearded Vulture (*Gypaetus barbatus*), a very large bird with long tail, feathered head, and bearded chin, is found in mountainous regions all across the Old World, and is one of the links between Vultures and Eagles; in the Himalayas it is called Golden Eagle. The true Golden Eagle (*Aquila chrysaetus*) is found all across the northern hemisphere. The best-known North American Eagle is, however, the White-headed Sea-Eagle (*Haliaetus leucocephalus*) with tail as well as head white. No typical Eagles inhabit South America, but there is one, the Wedge-tailed Eagle (*Uroaëtus audax*) in Australia, very dark in colour and slender in form.

Falcons, with dark eyes and long wings, such as the Saker illustrated, occur almost everywhere, our well-known Peregrine (*F. peregrinus*) being of nearly world-wide range; our Kestrel (*Tinnunculus alaudarius*) is replaced by very similar species in South Africa and Australia. The so-called Sparrow-hawk of America (*T. sparverius*) is a small and very pretty Kestrel. The true Sparrow-hawks (*Accipiter*) and the nearly-allied

but larger Goshawks (*Astur*) with light-coloured eyes and short wings, have as wide a distribution as the Falcons.

The scavenging Kites (*Milvus*) distinguished by their forked tails, are most familiar birds even in towns in the East, and very tame, especially the Yellow-billed (*M. ægyptius*) in Africa and the Pariah (*M. govinda*) in India ; the latter bird is literally as abundant as a sparrow in some places. In Eastern harbours the beautiful bay-and-white Brahminy Kite (*Haliastur indus*) is a common object and is found about water inland ; it is one of the conspicuous birds of India. This is not fork-tailed. The Harriers, with light eyes and long wings, tail and legs, are ground-breeding hawks of very wide range, and one of them (*Circus gouldi*) is the common hawk of New Zealand.

The widely-spread Caracara (*Polyborus brasiliensis*) of South America is typical of a group of carrion-hawks with very crow-like habits ; it is about as big as a raven, dark above, with whitish neck and under surface, the latter barred with black, the bill pale blue-grey.

The Chimango (*Ibycter chimango*) is an allied but smaller bird, light brown, and of the size of a rook. The so-called Jack-rook of the Falklands (*Ibycter australis*) is a hawk of this group, nearly as big as the Caracara, and mostly black ; it has a cawing note.

The fish-eating Osprey (*Pandion haliaëtus*), found nearly all over the world, is sometimes placed in a distinct family, but on slight grounds ; it has, like some others (*Elanus, Polioaëtus*), no web at the base of the toes, and the young have the down variegated.

Divers (*Colymbidæ*).

Diagnosis.—*Diving birds with webbed four-toed feet and a very short tail.*

Size.—From that of a duck to that of a goose, approximately.

Form.—*Bill* straight, rather long, of medium thickness; corner of mouth below front of eye. *Feet* at end of body, three front toes, of which the outer is longest, webbed; hind-toe small. *Wings* of medium length, narrow; body and neck medium; *tail* very short, but with true quills.

Plumage.—Normal, not silky as in grebes; dark above, pure white below. No sexual difference, but a seasonal change. Young like adults in winter dress.

Young.—Active, but less so than young ducks. Covered with dark down.

Nest.—A collection of vegetable matter on the shore close to the water.

Eggs.—Two only; oval, olive, with dark markings.

Incubation.—Four weeks.

Courtship.—Said to be conducted on the wing.

Food.—Fish and other aquatic animals.

Gait.—On land semi-erect and excessively awkward; the birds generally object to walking at all, and only push themselves along on their breasts. In the water they float low, and swim and dive with great power, using the legs only, not the wings.

Flight.—Direct, rapid, and strong, performed by continued beats of the wings, with neck and legs outstretched. They fly more readily than grebes, and often rise high, even in the daytime.

Note.—A harsh shriek or howl.

Disposition and Habits.—Wary, inquisitive and very courageous, turning even on man when brought to bay.

Economic Qualities.—There is nothing particular to be recorded on this head, as these birds are not numerous enough to be of any great influence.

Captivity.—Divers have seldom been kept in captivity, and need much the same treatment as grebes, allowing for their larger size. They have not bred.

Distribution and Important Species.—Divers are found all round the Northern Hemisphere, this being one of the families characteristic of this region. They breed in fresh water, and are found in winter on the coasts, only migrating south for open water. Only four species are known, all found in both worlds, the Black- and Red-throated (*Colymbus arcticus* and *C. septentrionalis*), the Great Northern (*C. glacialis*) and the arctic White-billed (*C. adamsi*).

Ducks (*Anatidæ*).

Diagnosis.—*Four-toed water-fowl with a straight beak toothed or ridged in both jaws.*

Size.—From that of a turtle-dove upwards; the tame swan is the largest.

Form.—*Bill* of medium length or short, usually broad, covered with skin instead of horn, except at the tip (which forms the so-called "nail") and furnished at the edges with horny ridges or "teeth"; corner of mouth not reaching further back than forehead; *feet* with the shanks of medium length or short, the three front toes usually fully webbed, hind toe usually small and useless; *wings* of medium length, or short. Body heavy, neck long or very long; *tail* short as a rule, and composed of numerous feathers.

Plumage and Colouration.—Very sleek, and much varied in colour; a conspicuous bar on the secondary

quills (the *speculum*) is a common ornament. Sexes often very different, in which case the male usually —not in South American or Australasian species— assumes a plumage more or less resembling that of the female for several weeks after breeding. In moulting, all the quills are usually shed at once. The young resemble the adult female, or have a dress of their own.

YOUNG.—Very active, feeding themselves, and clad in furry-looking down, which is either self-coloured or pied, varying much in different groups. The wing-feathers do not develop till the bird is nearly full sized.

NEST.—A rude collection of vegetable substances, usually lined with the female's own down. It is commonly placed on the ground, sometimes in a burrow, a hole of a tree or rock, or the old nest of some other bird.

EGGS.—Usually several (never less than two); without spots, white or pale in hue.

INCUBATION.—From three to six weeks.

COURTSHIP.—Variable; generally there is bowing or nodding of the head, and more or less raising of the elbows, but the wings are never drooped.

FOOD.—They are very omnivorous birds, most of them subsisting on small forms of animal life, and on land-and-water herbage, grain, etc. Some (Mergansers) are almost purely animal (fish) feeders, while the Geese are mainly vegetarian.

GAIT.—A swaying walk or "waddle"; but many can go far and run very well; the diving species are usually the most awkward on foot. They all swim, and most dive, some particularly well.

FLIGHT.—Heavy and direct, by continued beats of the wings; the neck and legs are outstretched. The large species fly with slower strokes than the small ones. Two species are flightless, or nearly so,

the Loggerhead (*Tachyeres cinereus*) and the Auckland Island Teal (*Nesonetta aucklandica*).

NOTE.—Not usually musical, a quack, croak, or cackle; they hiss when enraged in many cases. The male often has a much weaker note than the female.

DISPOSITION AND HABITS.—Usually peaceable and fairly intelligent; very wary if persecuted. In fighting they use both wings and bill.

ECONOMIC QUALITIES.—All appear to be edible, and many are excellent food, some being reputed as great delicacies. Their down and feathers are also valuable.

CAPTIVITY.—They bear captivity very well and four species are completely domesticated, the Common Duck (*Anas boscas*), Muscovy Duck (*Cairina moschata*), Chinese Goose (*Cygnopsis cygnoides*) and Common Goose (*Anser ferus*), while several other species of the family are commonly kept and bred for ornament, such as the Mute Swan (*Cygnus olor*).

DISTRIBUTION AND IMPORTANT SPECIES.—Birds of this family, which numbers about two hundred species, are found everywhere, but most numerously in temperate and cold climates; they are migratory in many cases. They usually affect open country, and the majority prefer fresh water. Some of the geese, however, very rarely swim at all.

The ordinary division into Swans, Geese, Ducks, and Mergansers, seems scarcely tenable, though convenient, as the relationships of all these groups are very close. The Magpie Goose of Australia (*Anseranas melanoleucus*), however, seems to deserve to rank as a sub-family by itself, as it differs from all the rest in having its front toes only webbed at the base, and the hind-toe well developed and resting on the ground, while it also moults its quills gradually, not all at once like the rest. The most widely familiar species is the

Common Duck or Mallard (*Anas boscas*), found all round the northern hemisphere in a wild state, and in most countries domesticated. The other domestic duck, the Muscovy, is a common wild bird in the warm parts of America. The wild representative of the Mallard in Australasia is the Grey Duck (*Anas superciliosa*), a dark-brown species with the sexes alike and much like the female of the common bird.

The celebrated Eider-Duck (*Somateria mollissima*) is a northern bird, as are all its allies, and, indeed, most diving ducks.

The Mandarin Duck of China and Eastern Asia generally (*Aex galericulata*) is almost as well known by repute on account of the wonderfully diversified plumage of the male, and especially his chestnut ruff and wing-fans; it is widely kept and often bred in captivity. Its near relative, the Wood-Duck of North America (*A. sponsa*) is completely domesticated in Europe, and there called the Carolina Duck. The Wood-Duck of Australia (*Chlamydochen jubata*), though also a small species, is goose-like in form. These three species are perchers and tree-breeders, as are also the Whistlers or Tree-Ducks (*Dendrocycna*), long-legged birds of striking but not brilliant colours, which are the characteristic ducks of the Tropics.

The Sheldrakes (*Tadorna*, *Casarca*, *Chenalopex*) are large strikingly-coloured species, with long legs and wings, widely distributed. The New Zealand Sheldrake (*Casarca variegata*), the only one of this group of ducks with a marked sex-difference, is well known as the Paradise Duck; the Egyptian Goose (*Chenalopex ægyptiacus*) is well known both in domestication and as a wild bird in Africa. The birds called Sheldrakes in America are really Mergansers (*Mergus*), saw-billed, fish-eating, diving

forms, of even wider distribution. Among the ordinary diving Ducks, the Canvas-back of North America (*Nyroca vallisneria*) is celebrated for the table; it much resembles our pochard (*N. ferina*), but is much larger.

Finfoots (*Heliornithidæ*).

Diagnosis.—*Rail-like water-birds with well-developed tails, short legs, and lobed feet.*

Size.—From that of a crow to that of a thrush.

Form.—*Bill* like that of many rails, compressed, moderate in length, with central nostrils, and corner of mouth half-way to eye; *feet* with short shanks, front toes lobed as in a coot, hind-toe fairly developed; *wings* short, like those of a rail; *tail* well developed. General appearance much like that of a cormorant, except for wings, bill, and lobed toes.

Plumage and Colouration.—Feathering close, not loose-textured as in rails; tail stiff in some. Sometimes a sex-difference, but no seasonal change. Feet bright coloured.

Young.—Those of the American *Heliornis surinamensis* said to be naked and carried under wings of parent.

Food.—Fish and other aquatic animals.

Gait.—In spite of the short legs they move actively on land, standing semi-erect. They swim and dive well, floating low in the water like a cormorant.

Flight.—Direct, by continuous beats of the wing; they rise off the water awkwardly.

Disposition, Habits, etc.—They are shy and solitary; very little is known about them, not even their nesting habits.

Economic Qualities.—The Asiatic species is delicious eating.

Captivity.—The South American form has been kept in its own country; and one specimen of the African has reached London alive, brought by Mr. J. D. Hamlyn.

Distribution and Important Species.—There are only three species, all found in warm climates: *Podica senegalensis*, the "Wasser-treter" (Water-treader) of the Boers, of Africa, south of the Sahara; the rare *Heliopais personata*, the Masked Finfoot, found from Assam to Sumatra; and the South American Finfoot above-mentioned, which is much smaller than the other two, and has the toes joined by a web at the base and barred across with black.

Flamingoes (*Phoenicopteridæ*).

Diagnosis.—*Tall and very slender waders with webbed feet and short bent-down beak.*

Size.—About that of a small goose to a duck in the body; but they are very tall, owing to the length of neck and legs.

Form.—*Bill* short, thick, bent down at an angle in the middle, corner of mouth not extending beyond forehead; upper jaw flattened, lower very deep, so that they recall a box and lid; the upper is more movable than the lower. Both are fringed with horny ridges and covered with skin instead of horn, except at the tip, as in ducks. *Feet* with very long shanks; thighs naked a long way above hocks; toes three in front, short, webbed; usually

a small, raised, useless hind-toe, but sometimes none. *Wings* moderate; *tail* short. Body small, neck and legs excessively long.

PLUMAGE AND COLOURATION.—In adults usually rosy-white; wings always red with black quills; young pale drab with darker streaks. A bare space between bill and eye. No sexual difference. All quills shed at once when moulting.

YOUNG.—Active, but fed at first by the parents, who disgorge into their mouths. They are clad in white down and have a straight beak.

NEST.—A rounded lump of mud, projecting from mud or water, scraped up by the birds. They always breed in colonies.

EGGS.—One or two; bluish-white, with chalky shell.

INCUBATION.—Thirty days or more.

FOOD.—Small aquatic animals and aquatic vegetation; they feed like ducks, but with head inverted, the upper jaw being used as the lower one is by a duck.

GAIT.—A walk; they swim fairly well, but slowly, sitting high in the water.

FLIGHT.—Heavy and direct, with neck and legs outstretched, and constant flapping. They start awkwardly by running, and fly in skeins like geese.

DISPOSITION AND HABITS.—Shy but stupid; essentially gregarious, but constantly quarrelling, though rarely, if ever, actually fighting.

NOTE.—A gaggling cackle, much like that of geese.

ECONOMIC QUALITIES.—The flesh is edible, and the plumage is used for ornament. As, however, the birds are completely harmless, and exceedingly picturesque, their chief use is in embellishing the landscape.

CAPTIVITY.—They live well if allowed constant access to water, and will eat grain like ducks; they are sometimes sensitive to cold, and in any case are

very awkward, not being at home on a slope or on ice. They have never bred.

DISTRIBUTION.—Almost everywhere in temperate or tropical regions, where there are large expanses of shallow water, especially if this is salt. There are, however, no species in the Australian region, and only nine altogether. The best-known are the Common Flamingo (*Phoenicopterus antiquorum*) of the Old World, and the rather smaller Red Flamingo (*P. ruber*) of America; this is of a pale vermilion, and is the only one so coloured.

FRIGATE-BIRDS (*Fregatidæ*).

DIAGNOSIS.—*Large sea-birds with long hooked beak, enormous wings, and small feet only partially webbed.*

SIZE.—About a yard long.

FORM.—*Bill* much like that of a cormorant, long, hooked at tip, nostrils in a groove, corner of mouth reaching below eye; *feet* with very short feathered shanks, all toes webbed at the base, the first turned backwards; *wings* enormous, both long and broad, the pinion-joints in repose projecting beyond breast; *tail* long and forked. Body very small.

PLUMAGE AND COLOURATION.—Dark, black in adult males, in females with white breasts, in the young with head also white. The feathering is like that of birds of prey, not water-fowl. Throat bare, with a dilatable red pouch in males.

YOUNG.—Helpless and fed by parents; clothed in white down.

NEST.—An open platform of twigs, placed on trees, bushes, or rocks.

EGGS.—One; white in colour.

COURTSHIP.—The male expands his scarlet pouch and droops and spreads his wings.

Food.—Surface fish, young turtles, etc.; they force other sea-fowl to disgorge fish, and devour the young of these, and even each other's offspring.

Gait.—A very feeble walk; they usually only perch, and very seldom settle on water, though able to swim.

Flight.—Probably the strongest among birds; they sail for long periods on motionless wings or execute magnificent swoops; in flight they carry the neck drawn in.

Note.—A scream or a cackling sound.

Disposition and Habits.—They are thoroughly piratical, but sociable; they are practically aerial, not aquatic, though always on the sea-coast.

Economic Qualities.—They are eaten in some places, and found to be good.

Captivity.—They have not often been kept, but one species (*F. aquila*) has lived a long time in the London Zoo, though requiring to be fed by hand all the time. In some Pacific islands they are often hand-reared and semi-domesticated, flying at large and coming home to roost.

Distribution and Species.—Tropical seas, but only breeding locally, on remote islands as a rule. There are only two species, the Large Frigate-Bird (*Fregata aquila*), widely distributed round the world, and the Small Frigate-Bird (*F. ariel*), which, in addition to its smaller size, has a white flank-patch in the male, and white collar in the female. It is confined to the Indian and Pacific oceans.

Frogmouths or Moreporks (*Podargidæ*).

Diagnosis.—*Perching birds, with wide short bills, short wings, and short shanks, with the hinder toe smallest.*

Size.—From that of a rook to that of a thrush.

By permission of the Oxford Museum.

African Fin-foot (*Podica senegalensis*). (*See p.* 38.)

The curiously cormorant-like shape of this bird (*Podica senegalensis*) contrasts strangely with its typically rail-like bill and lobed toes.

[*To face p.* 38.

Photo copyright by W. P. Dando, F.Z.S.

Magpie-Goose (*Anseranas melanoleuca*). (*See p.* 32.)

The legs of this bird are bright orange, and its face flesh-coloured.

Photo copyright by W. S. Berridge, F.Z.S.

Large Frigate-bird (*Fregata aquila*). (*See p.* 38.)

The white head of this specimen shows it to be immature, adults having black heads.

[*To face p.* 38.

Photo copyright by W. S. Berridge, F.Z.S.

Morepork, *or* **Australian Frog-mouth** (*Podargus cuvieri*).

(*See p.* 39.)

This bird (*Podargus cuvieri*) is about the size of a crow; the large mouth and eyes are well shown in the photograph.

FORM.—*Bill* short, usually very strong and broad, with gape of mouth wide, corner of mouth under eye; nostrils slit-like. *Feet* small, with short shanks, but strong, with first toe smallest and directed backwards as usual, outer front toe turned out at right angles to middle. *Wings* short, rounded; *tail* rather long and rounded. Head and eyes very large and body quite small.

PLUMAGE AND COLOURATION.—Plain, but finely and minutely mottled, resembling bark, as in nightjars; general tone greyish or reddish. In some species this difference is sexual, males being grey; otherwise no sex-difference. "Horns," or ear-tufts, sometimes present. Eyes dark or yellow.

YOUNG.—Helpless and covered with white down.

NEST.—An open platform of twigs on a tree, or of bark and down matted together; sometimes a hole in a tree.

EGGS.—One or two only; white.

FOOD.—Insects and probably small vertebrates. They, at any rate the common Morepork (*Podargus cuvieri*), do not cast pellets like owls, though eating birds and mice in captivity.

GAIT.—An awkward owl-like walk or hop. They usually sit across the bough when perching, not along it like nightjars.

FLIGHT.—Soft, as in nightjars, but probably less easy and protracted.

NOTE.—Harsh and peculiar.

DISPOSITION AND GENERAL HABITS.—They seem remarkably sluggish, but have very curious gestures, and their attitudes often make them appear like stumps of wood; they are nocturnal, and sleep more soundly by day than most birds of such habit.

ECONOMIC QUALITIES.—The insect-eating habits of the family must make them very useful.

CAPTIVITY.—The common Australian Morepork (*Po-*

dargus cuvieri) does well in captivity, and several have been kept at the London Zoological Gardens, but they usually have to be hand-fed.

DISTRIBUTION AND IMPORTANT SPECIES.—Frogmouths, of which there are about two dozen species, range from Southern India to Australia. The best known is the large greyish "Morepork" above mentioned. The Owlet-Nightjars (*Aegotheles*), whose weak bills are like those of true nightjars, are the hole-nesting group, while the "eared" species of *Batrachostomus* build the curious pad-like nests, the Moreporks being stick-nest builders.

GAME-BIRDS (*Phasianidæ*).

DIAGNOSIS.—*Ground-birds, with short arched beak and four toes, the hind one notably small and all front ones webbed at base.*

SIZE.—From that of a sparrow to that of the Turkey—the largest species.

FORM.—*Bill* short and strong, with arched outlines, nostrils roofed over on the inner side, and corner of mouth half way to eye; *feet* with strong shanks, and three front toes webbed at base, hind-toe much smaller; spurs on the shanks, generally in the males, are often found in this family, and in this only. *Wings* short and arched; *tail* very variable, usually of numerous feathers. *Head* small, neck rather long, body heavy.

PLUMAGE AND COLOURATION.—Prevailing colour of females, and often both sexes, a closely-mottled brown of protective value, varying in pattern; but many males are brilliant beyond all other birds; rarely any seasonal change, but young usually resembling adult female at first. Ornamental plumes, and expansible areas or processes of naked skin about the head, occur frequently.

YOUNG.—Active and downy, the down usually with longitudinal brown and creamy stripes. They run and feed themselves from the first, but are looked after by the hen or both parents. They fledge on the wings first, and can fly in a few days, but they change their chicken quills the first autumn.

NEST.—Merely a "scratching" on the ground, lined with a little vegetable rubbish.

EGGS.—Several; usually plain and pale (but seldom white), but often also more or less spotted.

INCUBATION.—From three weeks to a month, according to the size of the species; the female is always left to sit by herself.

COURTSHIP.—Elaborate; the display is usually either frontal, as in the Peacock and Turkey, or lateral, as in the Pheasant, which displays sideways. It varies a great deal in different groups, and the erection or dilatation of naked combs, wattles, eyebrows, etc., is notable. Some Grouse have dilatable neck-sacs.

FOOD.—Seeds, herbage, fruit, insects; any small edible articles, in fact, though vegetables form the chief source of subsistence. The young are much more insectivorous than the adults.

GAIT.—An active walk or a quick run. Many perch occasionally, especially at night. Some species can swim, the Turkey and Pheasant, for instance.

FLIGHT.—Heavy and direct, and seldom protracted far; it is performed either by continuous flapping, or by alternate flapping and sailing. The neck and legs are extended in flight.

NOTE.—Usually harsh, a scream, cackle, or some such sound; some, however, whistle. The males usually have a very characteristic call or "crow." Many species make a noise with their wings when courting.

Disposition and Habits.—These are not very intelligent birds, and the males are intensely quarrelsome in the breeding season; but, on the whole, they are sociable. They dust themselves instead of bathing, and usually scratch for food. Almost all polygamous birds belong to this family.

Economic Qualities.—This is the most valuable family of birds, their use for food being so well known, while the small species are great destroyers of insects and weed-seeds—as, indeed, are the larger, though these may be destructive to crops.

Captivity.—These birds are easy to keep and breed, and we have several species fully domesticated—the Common Fowl, Guinea-Fowl, Turkey and Peacock, not to mention the Golden and Silver Pheasants, reared for the last century in captivity, and several less well-known kinds also regularly bred in aviaries. Many are also bred for sport.

Distribution and Important Species.—The family, which contains nearly four hundred species, as a whole, is found all over the world, but hardly any species except the widely-ranging Common Quail (*Coturnix communis*) of the Old World is migratory. The various sectional groups, however, have very distinct habitats. The Grouse (*Tetraoninæ*), with feathered covering to the nostrils and toes either feathered or fringed at the sides with narrow scales, are confined to and eminently characteristic of the northern parts of the Old World. They are often ranked as a separate family. The Guinea-fowls are purely African, the Turkeys American, as are also the group of Quails known as Colins, of which the pretty crested Californian Quail (*Lophortyx californicus*) is a familiar example, and also the Bobwhite (*Colinus virginianus*), the familiar game-bird of the United States. The Pheasants, Pea-fowl

and Jungle-fowl are all Asiatic, except the Common Pheasant, which classical legend represents as an introduced bird in Europe, as it probably was. The group of Partridges known as Francolins are chiefly African, but a few Asiatic also. Only Quails and Partridges occur in the Australian region, and not even these in the Pacific islands. Some of the South African Francolins are locally called Pheasants.

The ancestor of our many breeds of fowls is the Red Jungle-fowl of India and further east (*Gallus gallus*), a bird coloured like the "black-breasted red" breeds; the Peacock (*Pavo cristatus*) is practically indistinguishable from its Indian wild ancestor, except when abnormally coloured, having varied but little; nor have the Turkey (*Meleagris gallopavo*) of North America, or the Guinea-fowl (*Numida meleagris*) of West Africa, altered much except in colour.

The Pheasant, commonly preserved as a game-bird, was originally the West-Asiatic *Phasianus colchicus*, but this has during the last century been much modified by crossing with the ring-necked Chinese form, *P. torquatus;* and now other allied species have been widely intermixed with it. Pheasants of this type are now common, by introduction, in North America and New Zealand; but, naturally, Pea-fowl, Pheasants of all kinds, and Jungle-fowl are Asiatic birds. The Monauls (*Lophophorus*), notable for their comparatively large bills and short tails and the resplendent metallic plumage of the cocks, inhabit the mountains of India and China, as do also, though at a lower elevation in most cases, the equally short-tailed but beautifully spotted Tragopans (*Tragopan*), the males of which have erectile fleshy horns of blue and similarly extensible dewlaps, of

gay colours. They are sometimes called Argus Pheasants, but the true Argus (*Argusianus argus*) is a very different bird, with enormously long secondary quills, ornamented with eye-spots, concealed in repose, and very long centre tail-feathers. Another Eastern group with eye-spot markings is that of the Peacock-Pheasants (*Polyplectron*).

Of Partridges, the common British species (*Perdix perdix*) ranges to Persia; further east its place is taken by the smaller Bearded Partridge (*P. barbata*), often sent over here frozen; this has a black instead of chocolate-brown patch on the breast. The Chukore Partridge of India (*Caccabis chukar*) extends from Greece to China, and is much like our Red-leg, but greyer, and without the fringe of black spots below the black necklace found in that bird (*Caccabis rufa*).

Among the Grouse, the Ryper, or Willow-grouse (*Lagopus albus*), ranges all round the world in the high north; it is very similar to our Red Grouse (*L. scoticus*), confined to the British Islands. The Ryper, however, has always a white belly and wings, and turns white in winter, this being the "Ptarmigan" commonly seen for sale in poulterers' shops. It does not occur naturally in Britain. The other Ptarmigans also all turn white, and are found on high mountains in the Northern hemisphere in both worlds, one species (*L. mutus*) being found in Scotland. Our Blackcock (*Lyrurus tetrix*), almost the only game-bird with a forked tail, is found all across the Old World, but the large Capercailzie (*Tetrao urogallus*), the biggest of all Grouse, is replaced in Eastern Siberia by allied species. Hybrids between these two birds often occur, and hybridism is more frequent among Grouse than in any other birds.

Of the American Grouse, the Ruffed Grouse (*Bonasa umbellus*) is the most familiar; it is closely

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Grey Peacock-Pheasant (*Polyplectron chinquis*). (*See p* 44.)

The photograph renders the coloration of this species almost perfectly, except for the eye-spots, which are resplendent green and purple. The Peacock-Pheasants are small species, none equalling the Common Pheasant in size.

[*To face p.* 44.

Photo copyright by W. S. Berridge, F.Z.S.

Southern Skua (*Megalestris antarcticus*). (*See p.* 53.)

This predatory Gull is almost indistinguishable from the Northern Skua or "Bonxie." The dropped position of the wing is not normal.

allied to the Hazel-hen (*Tetrastes bonasia*) of the Old World, but has a frill of purple-black feathers on each side of the neck. It is often called "Pheasant" or "Partridge." The Prairie-hen (*Tympanuchus americanus*) is a brown, barred bird, with a pair of wing-like appendages on the neck, and is widely spread in open country in North America. The largest American Grouse is the Sage-cock (*Centrocercus urophasianus*) of the barren eastern plains; it has a long tail of pointed feathers.

Many game-birds have been acclimatized in other countries, especially the Pheasants; owing to their limited powers of flight they are easy to establish, but on account of their quarrelsome nature two species of the same size will seldom live side by side.

Gannets (*Sulidæ*).

Diagnosis.—*Sea-fowl with straight bills, with no perceptible nostrils, all four toes webbed, and long wings.*

Size.—From that of a goose to that of a duck.

Form.—*Bill* stout, straight, slightly curving towards tip, the covering grooved, nostrils obsolete, corner of mouth reaching beyond eye; *feet* with short shanks and all four toes webbed, the first pointing inwards or backwards; *wings* long, pointed; *tail* moderate, pointed; neck long.

Plumage and Colouration.—Feathering white or brown; no sexual difference or seasonal change; but young different from adults, being darker. Face always more or less bare.

Young.—Helpless, and fed by parents; at first naked, then clothed in thick white down.

NEST.—A collection of sea-weed, etc., placed on rocks, trees, or bushes.

EGGS.—One or two; with a coat of chalky matter over a blue shell.

INCUBATION.—About six weeks (in the Common Gannet).

FOOD.—Fish and other marine animals; some species plunge for this from a height like our Gannet, others fly low and sweep down on it, like the Booby.

GAIT.—A slow and awkward walk; they carry the body horizontal, not erect like Cormorants; they swim high and lightly. The tropical species perch on trees.

FLIGHT.—Very powerful, performed by alternate flappings and sailings; the neck is extended in front and the feet carried under the tail.

NOTE.—A harsh croak or cackle; but they are not constantly noisy like gulls.

DISPOSITION AND HABITS.—Although sociable, they are somewhat surly in temper; they are purely marine, never coming inland voluntarily.

ECONOMIC QUALITIES.—The young of the Common Gannet are used as food, and several of the tropical species are valuable guano-producers.

CAPTIVITY.—Gannets do not do well as a rule in this condition, probably because they take hardly any exercise; but Booth was very successful in keeping the common European species many years ago, and they bred and reared young.

DISTRIBUTION AND IMPORTANT SPECIES.—About eight kinds of Gannets are known, mostly inhabiting the warmer seas; our only British species (*Sula bassana*) is widely distributed over the northern seas and is the only kind in the north. The most familiar species in tropical seas is the Common Booby (*Sula sula*), about as big as a wild duck,

and brown, with white belly and pale yellow bill and legs. The Gannets of the Southern seas, the Malagash (*S. capensis*), of the Cape, and the Australian Gannet (*S. serrator*), of Australasia, are much like our bird, but have black in the tail.

GREBES (*Podicipedidæ*):

DIAGNOSIS.—*Diving birds with lobed feet and no stiff tail-feathers.*

SIZE.—From that of a mallard to that of a quail, approximately.

FORM.—*Bill* straight, varying in length and thickness; gape reaching to beneath front of eye. *Feet* at end of body, with three front toes, the outer one longest, and a small hind-toe, all lobed and with flat, blunt nails, that of the middle toe saw-edged inside. *Wings* rather short, very compactly folded. Body short, neck long; *tail-quills* wanting.

PLUMAGE AND COLOURATION.—Feathering of peculiarly silky texture, brown or blackish above, satiny-white below in most cases. No sexual difference, but usually a seasonal change. First plumage like winter dress of adults. The quills are shed simultaneously in the moult.

YOUNG.—Active, but for the first few days carried on the back of the parents, and fed by them for some time. Down close, revealing the shape, which is much like that of the adult; it has numerous longitudinal light and dark stripes. The wings do not fledge till the body is feathered, and the head remains downy even then.

NEST.—A mass of wet vegetable matter deposited on water-plants or tussocks projecting from the water, or even on boughs just above or touching it. The

nest is always damp, and the eggs are covered with weeds by the sitting bird when leaving it.

EGGS.—Several; oval in shape, and pure white when laid, but becoming stained buff to chocolate by the wet vegetable matter of the nest.

INCUBATION.—About three weeks.

COURTSHIP.—Chiefly consists in meeting face to face and uttering various notes; no special display.

FOOD.—Small aquatic animals and aquatic plants; insects captured from the surface. Many species swallow their own feathers. The digestion is powerful; no castings are ejected, even the feathers being apparently digested.

GAIT.—On land semi-erect and awkward, especially in the large species; it is an effort for the bird to rise up, and it easily falls down. They have great powers of swimming and diving; under water the legs are used simultaneously, the wings not at all.

FLIGHT.—Direct and rapid, with the neck and legs extended, and continuous wing-beats; mostly performed at night. The birds have much difficulty in starting, and alight breast first, with the legs trailing and wings working continuously. One species, *Podicipes micropterus*, the Flightless Grebe of Lake Titicaca in the Andes, has such small wings that it cannot fly at all. Most will dive rather than fly.

DISPOSITION AND HABITS.—Grebes are intelligent, courageous, and much attached to their young. Very wary when persecuted, they become tame and inquisitive where protected.

NOTE.—A croak in the larger species, an almost musical trill in some Dabchicks.

ECONOMIC QUALITIES.—These birds are hardly to be reckoned as either beneficial or destructive. The skins of the Great Crested Grebe (*Podicipes cristatus*) are utilized as furs, and it is considered to give good

sport when hunted in a boat; it might well be protected as a sporting and fur-bearing animal. The skins of the Flightless Grebe are used for saddle-cloths. In the interest of their habits the Grebes yield to no birds whatever.

CAPTIVITY.—Grebes are seldom kept confined, but will live if their food be varied and they are allowed *constant* access to water. If kept out of it for even a day, their plumage lets in the wet like a land-bird's. They need a good-sized swimming place and only a small landing. They have never bred in captivity, or even laid, so far as I know.

DISTRIBUTION AND IMPORTANT SPECIES.—The family, containing about two dozen species, is of world-wide range, the northern species migrating south in winter in search of open water. They are usually fresh-water birds, but in winter may be found on the coasts. The Dabchicks, as the small species are called, are the best known, and one or another is found everywhere. Our Great Crested Grebe (*Podicipes cristatus*) is distributed almost all over the Old World, and the Pied-billed Grebe (*Podilymbus podiceps*), about the size of a partridge, with short, thick bill, is equally wide-spread in the New. In America, Grebes are often called Hell-divers.

GUACHARO (*Steatornithidæ*).

DIAGNOSIS.—*A long-winged bird, with hawk-like bill and excessively short, scaleless shanks.*

SIZE.—About that of a crow.

FORM.—*Bill* very hawk-like, hooked and toothed at edge near tip, corner of mouth below eye; numerous bristles at base of beak; *feet* with very short shanks without scales, and three front toes, all

free to the base, and a smaller hind-toe. *Wings* long; *tail* rather long. Head of moderate size.

PLUMAGE AND COLOURATION.—General hue chestnut-brown, with darker markings, and white variegation on wings. No difference according to age, sex, or season.

YOUNG.—Helpless, and remarkable for its extreme fatness.

NEST.—A thick, round, open structure of mud, placed in convenient places on the walls of caves. They nest in colonies.

EGGS.—Two or more; white.

FOOD.—Chiefly, if not entirely, fruit; this being the only fruit-eating night-bird. The stones of the fruit eaten are ejected from the mouth.

GAIT.—They seem hardly to move about on foot, picking their food from the trees while on the wing.

FLIGHT.—Powerful.

NOTE.—A harsh scream and clatter.

DISPOSITION AND HABITS.—This bird is nocturnal, frequenting caves during the day.

ECONOMIC QUALITIES.—It is of great utility, the young supplying a large quantity of oil, which is much prized locally, whence the name "Oil-bird" often given to the species.

CAPTIVITY.—The bird has been exhibited at the London Zoological Gardens.

DISTRIBUTION.—The single species known (*Steatornis caripensis*) is confined to Northern South America and Trinidad.

GULLS (*Laridæ*).

DIAGNOSIS.—*Long-winged birds, with front toes more or less webbed, small hind-toe, and slit-like nostrils.*

SIZE.—From that of a small goose to that of a starling.

FORM.—*Bill* variable in form, but generally of medium length, and flat-sided, with nostrils slit-like and generally far forward, corner of mouth below eye; *feet* with shanks of variable length, front toes usually fully webbed, though in some the webbing is very slight; hind-toe usually very small. *Wings* long and pointed; *tail* moderate or long. *Head* large, and body light.

PLUMAGE AND COLOURATION.—Colouration usually showing much white in adults; no sex-difference, but often a seasonal change. Young usually mottled brown, and very unlike adults. Beak and feet usually bright-coloured.

YOUNG.—Downy and rather active, but the food is disgorged for them by their parents, though they can pick it up. Their down is usually grey, with dark spots.

NEST.—A loose, open structure of sticks, sea-weed, etc., placed on the ground, on rock-ledges, or on trees and bushes.

EGGS.—One to four; spotted.

INCUBATION.—Three to four weeks.

COURTSHIP.—Very demonstrative, the male arching his neck, or lowering it with the head turned up, and opening his wings at the pinions, while keeping them closed at the tip.

FOOD.—Fish, and other marine animals; carrion, mice, insects and berries are eaten by many species; they also often eat the eggs and young of other birds. Indigestible substances are disgorged as "castings."

GAIT.—The typical gulls walk easily and gracefully, but some of the short-legged Terns waddle, and walk but little. They swim lightly, but hardly any can dive. Many of them perch on trees.

FLIGHT.—Slow, but graceful, and long-sustained. The Skuas and Noddies fly with quicker strokes.

NOTE.—A scream, cackle, or laugh. Some make an almost cooing sound when courting.

DISPOSITION AND GENERAL HABITS.—They are usually sociable, and have considerable courage and intelligence.

ECONOMIC QUALITIES.—They are of use as scavengers and vermin-destroyers, and are sometimes used as food. Some of the largest species are destructive to game and wild-fowl, and even lambs.

CAPTIVITY.—The typical gulls do very well in captivity, and several species breed freely. Skuas, Terns, and even Skimmers have also been successfully kept, but the last in the New York Zoological Park only.

DISTRIBUTION AND IMPORTANT SPECIES.—Some or other of the species of these birds, about a hundred and twenty in number, are found everywhere, chiefly along sea-coasts, but also inland about wide rivers, lakes and marshes; they always keep in the open. Many of them are migratory; and, while some range very widely, others have a quite restricted habitat.

Our Herring-Gull (*Larus argentatus*)and the greater Black-backed Gull (*L. marinus*). range all round the northern parts of the world, while the Lesser Black-back (*L. fuscus*), although confined to the Old World, is found from the Faröes to Aden. The small Black-headed Gull (*L. ridibundus*), our commonest species, ranges almost all over Europe and Asia, visiting India in winter. The common Gull of Indian coasts is, however, the very similar Brown-headed Gull (*L. brunneicephalus*), but this is a winter visitor.

In southern waters the species of Gulls are much fewer; the large black-backed forms are represented chiefly by the Dominican Gull (*L. dominicanus*), while the small Jameson's Gull (*L. jamesoni*),

grey and white, with scarlet bill and feet and white eyes, is common on Australasian coasts. The Burgomaster (*L. glaucus*), as big as the Great Black-back, but with no black in its plumage, and the small pure white Ivory Gull (*Pagophila eburnea*) are characteristic Arctic forms, and the two Kittiwakes (*Rissa*), in which the hind-toe is quite rudimentary, are also northern, though not so much so. In the Red Sea the brown Hemprich's Gull (*L. hemprichi*) is a familiar species.

The Terns (*Sterna*), with straight bills and small feet, are found all over the world, even where gulls are absent during all or most of the year, and breed in any climate. Our Arctic Tern (*S. macrura*) ranges from the Arctic to the Antarctic Continents. The Noddies, which are dark brown or grey (*Anous*), or pure white (*Gygis*), are tropical birds. The White Noddies, like the Marsh Terns (*Hydrochelidon*), have the feet hardly at all webbed, and in the former the hind-toe is fairly well developed. They lay their one egg on a bough or rock, with no nest.

One or other of the five species of Skimmers (*Rhynchops*) is found all round the world in warm climates ; they are like large black-and-white Terns, with the under jaw in the adult twice as long as the upper ; they skim the surface, ploughing it with the long lower jaw, and thus snap up small fish, etc.

The Skuas (*Stercorariinæ*), which have very fully-webbed, strong-clawed feet, and brown plumage, are never found breeding in warm climates. They are predatory and piratical, making other sea-fowl disgorge their prey, and are some of the fiercest of birds. The few species are mostly northern, but our Great Skua, or Bonxie (*Megalestris catarrhactes*) is represented by very similar forms in southern seas.

Hammerkop (*Scopidæ*).

Diagnosis.—*A moderate-sized wader with longish deep bill hooked at the tip, front toes all webbed at base, and large hind-toe.*

Size.—About as large as a crow.

Form.—*Bill* rather long, deep, straight, with a hooked tip; *feet* with shanks of moderate length, and three front toes webbed at base, hind-toe well developed; *wings* large, broad; *tail* medium; *head* large, crested; neck rather short.

Plumage and Colouration.—Brown, with portions of the plumage, chiefly the tail, barred; much like that of many birds of prey. No difference according to age, sex, or season. Bill and legs black.

Young.—Helpless, and fed by parents.

Nest.—A very large domed structure of sticks, placed on trees or rocks, and often ornamented with various objects.

Eggs.—Several; white.

Food.—Fish, frogs, reptiles, etc.

Gait.—A walk. It perches freely.

Flight.—Light and easy; the neck and legs outstretched.

Note.—A croak or a weak metallic sound.

Habits and Disposition.—This bird is somewhat sociable, lively and playful; it is inclined to be nocturnal.

Economic Qualities.—It no doubt destroys vermin.

Captivity.—This bird has thriven well at the London Zoological Gardens.

Distribution.—There is only one species (*Scopus umbretta*), found in Africa and Madagascar.

Hemipodes (*Turnicidæ*).

Diagnosis.—*Small quail-like ground birds with no web at base of toes, and nostrils reaching from base to centre of bill.*

Size.—From that of a small partridge to that of a sparrow.

Form.—*Bill* short to medium, corner of mouth below eye; nostrils covered on the inner side, and reaching from base to centre of bill; *feet* with shanks of medium length, with a single row of scales in front, and usually three toes, not united by web at base; *wings* short; *tail* short and soft; head bigger than in true quails.

Plumage and Colouration.—Plain-coloured and much variegated, the females handsomer and larger than the males, the young resembling the latter; sometimes a slight seasonal change. Eyes conspicuously light-coloured.

Young.—Downy and active, much like young quails. The male only attends to them.

Nest.—On the ground, made of dry grass, etc., often domed.

Eggs.—Several; somewhat conical in shape, and spotted on a pale ground.

Incubation.—About twelve days, the male only sitting.

Courtship.—Conducted by the female, which raises her tail and utters a cooing call; she also calls the male to food.

Food.—Insects and seed, herbage, etc.

Gait.—A walk or run.

Flight.—Performed by quick continued fluttering of the wings, and usually only for short distances.

Note.—A cooing or groaning call.

Disposition and Habits.—Unsociable; the females are very quarrelsome and fight much with each other.

Economic Qualities.—They seem to destroy many

insects, and are good to eat, but are hardly taken seriously as game-birds.

CAPTIVITY.—They thrive well, and often get remarkably tame, so as to let themselves be touched. Several species have been bred successfully in England and Germany.

DISTRIBUTION AND IMPORTANT SPECIES.—The score of species are found in warmer parts of the Old World; one (*Turnix sylvatica*) is found in Southern Europe. In Australia occurs the only four-toed species (*Pedionomus torquatus*). In India they are called Button-quails.

HERONS AND BITTERNS (*Ardeidæ*).

DIAGNOSIS.—*Straight-billed wading-birds, with deep gape, long hind-toe, and the two outer front toes webbed at base.*

SIZE.—From little bigger than a thrush to four feet high.

FORM.—*Bill* straight, hard, pointed, usually long, with nostrils at the base at the end of a groove running down the bill, corner of mouth below eye; thighs usually bare above hocks; *feet* with long shanks and four toes, the hinder strong, and resting on the ground, the two outer front toes united at base by a short web; middle claw toothed inside; *wings* large and broad; *tail* short; neck long, with an S-like curvature in repose; body meagre, flat-sided. In the Boatbill the bill is flat.

PLUMAGE AND COLOURATION.—Feathering powdery, usually grey or white, sometimes brown; ornamental plumes common, often only worn in breeding season. Seldom any sexual difference, but young usually unlike adults. Albinism is more common in some species of this family than in almost any other birds. There is always a bare

space from bill to eyes, which are nearly always yellow.

YOUNG.—Helpless, scantily clothed with hair-like down; gaping for food, and constantly uttering a cry like *get-get-get.*

NEST.—An open platform of twigs, usually in trees; sometimes in rushes or on rocks.

EGGS.—Several; coloured or white, spotless.

INCUBATION.—From between two and three to between three and four weeks.

COURTSHIP.—Crest and ornamental back-plumes raised.

FOOD.—Small animals, especially fish. They usually stand waiting for food, and do not search about for it much. Some feed much on insects.

GAIT.—A slow walk; only a few run. They are quite at home in trees, and some climb actively about in reeds. They can swim, but rarely do so.

FLIGHT.—Heavy, with slow or rapid continuous strokes of the wing, according to the size of the species, the larger ones using the slower stroke. When flying, the neck is drawn in, and the legs stretched out, the hind-toes elevated, and the points of the wings incline downwards. They do not sail or soar except when about to alight.

NOTE.—A croak or booming sound.

DISPOSITION AND GENERAL HABITS.—Generally sluggish, surly and savage, unsociable except when breeding, and then constantly quarrelling. They strike at the eyes when fighting.

ECONOMIC QUALITIES.—They are destructive to fish, but also destroy many injurious animals, such as mice and insects. The Common Bittern is good eating, and the Egrets supply plumes, obtained most cruelly from breeding birds.

CAPTIVITY.—They live well, but have seldom bred. The Night Heron (*Nycticorax griseus*) has, however, bred in the London Zoological Gardens

Distribution and Important Species.—Birds of this family, which contains about a hundred species, are found all over the world, but chiefly in hot climates, always, of course, near water, usually fresh rather than salt. Our common British species (*Ardea cinerea*) is widely distributed over the Old World; in America the very similar *Ardea herodias* (Great Blue Heron) is common; this has cinnamon markings on the wing-edges and thighs. In America the Little Green Bittern (*Butorides virescens*), about as big as a jackdaw, and dark-green and grey, is well known. In India the most familiar is the pied drab-and-white Paddy-bird, or Pond Heron (*Ardeola grayii*), about the size of the last.

Hoatzin (*Opisthocomidæ*).

Diagnosis.—*A tree bird, with short stout bill, long tail, and four well-developed toes, the hinder one smallest, and none connected by webs.*

Size.—About that of a pheasant.

Form.—*Bill* short, stout; corner of mouth below forehead; *feet* with shanks of moderate length, toes four, first one directed backwards, front ones not united at base; *wings* broad, but short; *tail* long and rounded; head small, crested.

Plumage and Colouration.—Feathering coarse in texture; no sex-difference or seasonal change; young resembling adult; head with a full crest of narrow feathers. Face bare.

Young.—Clothed at first with scanty hair-like down, then with a thicker fawn coat; active climbers, and able to swim and dive on occasion; in climbing they use not only the bill and feet, but the wings, which have well-developed claws on the two first fingers

NEST.—A platform of twigs placed on a bush over water.

EGGS.—Several; spotted, much like those of rails.

FOOD.—Leaves and berries, especially of aroids.

GAIT.—They move actively among the branches, but seem not to come to the ground.

FLIGHT.—Heavy and awkward, and not prolonged to any distance.

NOTE.—A harsh hissing screech.

DISPOSITION AND HABITS.—They are sociable and keep in flocks.

ECONOMIC QUALITIES.—Their interest is purely scientific; they are not insectivorous, and of no use as food, having a very unpleasant smell.

CAPTIVITY.—They have not been kept in captivity in Europe as yet.

DISTRIBUTION.—South America, along the sides of rivers. There is only one species (*Opisthocomus hoazin*), a rather handsome bird, coloured buff, brown and chestnut, and known as "Hanna," "Çigana," "Stinking Pheasant," or "Governor Battenberg's Turkey."

HONEY-GUIDES (*Indicatoridæ*).

DIAGNOSIS.—*Small pair-toed birds, with small beaks with curved profile.*

SIZE.—From that of a lark to that of a linnet.

FORM.—*Bill* short, with curved profile, usually thick and very like a finch's; *feet* with toes in pairs, the first and fourth turned back, all free. *Wings* short; *tail* moderate. General appearance like an ordinary "small bird."

PLUMAGE AND COLOURATION.—Plain, with some markings of yellow, and white in the tail. Sometimes a sex-difference, but no seasonal change. Young much like the adult.

YOUNG.—Naked and helpless, with a hooked tip to both jaws.

NEST.—None, the birds being parasitic and laying in the nests of other species.

EGGS.—White.

FOOD.—Insects, chiefly bees, wasps, and their grubs, honeycomb, and sometimes apparently other small birds.

GAIT.—They are chiefly to be seen on trees ; presumably they hop.

FLIGHT.—Undulating.

NOTE.—A repeated chatter.

DISPOSITION AND HABITS.—Several of the African species are well known from their strange habit of leading men to bees' nests, in order to obtain a share of the comb. They attract attention, and then fly on ahead till the nest is reached ; such an action seems to denote unusual intelligence. They are usually solitary.

ECONOMIC QUALITIES.—They are, of course, regarded as very useful birds on account of the above peculiarity.

DISTRIBUTION AND IMPORTANT SPECIES.—There are only eleven species known, mostly African, but one —a rare bird (*Indicator xanthonotus*)—is Indian, and one, *I. archipelagicus*, Malayan. The best-known species is Sparrman's Honey-guide (*Indicator indicator*), which is widely spread over Africa, and has been long familiar to travellers. This is rather larger than a sparrow, brown, with a yellow patch on each shoulder and a white bill, the male with a black throat, the female with this part white. The commonest species in South Africa is, however, the Lesser Honey-guide (*I. minor*), smaller, and olive in colour, with a black bill ; in this the sexes are alike.

Hoopoes (*Upupidæ*).

Diagnosis.—*Perching birds, with long, slender bills, broad wings, and short legs, with three toes in front and a smaller hind-toe.*

Size.—From that of a dove to that of a lark.

Form.—*Bill* long, slender, more or less curved down, with the corner of mouth under front of eye, and the tongue very short; *feet* with short shanks and three toes in front, nearly free, and a hind-toe shorter than the rest, but well developed; *wings* short, but broad and rounded; *tail* medium or long.

Plumage and Colouration.—Chiefly black-and-white, combined with sandy-brown in the typical Hoopoes; no sex-difference or seasonal change, and young like adults or differing but little.

Young.—Naked and helpless, with soft expanded skin at corners of mouth.

Nest.—In a hole, scantily-lined and ill-smelling.

Eggs.—Several; greenish-white or sea-green; unspotted.

Incubation.—Sixteen days in the Common Hoopoe.

Courtship.—In the Common Hoopoe (*Upupa epops*) the male erects his crest, as he does also when afraid or angry.

Food.—Insects, and other small invertebrates.

Gait.—In the true Hoopoes a mincing walk like a pigeon's; they perch at times; the Kakelaars, or Wood-hoopoes, are entirely tree-birds, and climb about the trunks and boughs like Woodpeckers.

Flight.—Light and easy, but not fast, performed in an undulating manner; in the Common Hoopoe the neck is drawn in and the feet tucked up in front, and the crest lies so flat that it is not noticeable; this bird escapes from hawks with ease.

Note.—A soft hoot in ordinary Hoopoes, or a jarring sound; the Wood-hoopoes cackle noisily.

DISPOSITION AND HABITS.—The typical Hoopoes are solitary and quiet, the Kakelaars social and noisy.

ECONOMIC QUALITIES.—These birds are most useful insect-destroyers, and also very ornamental. The Common Hoopoe is eaten in Southern Europe.

CAPTIVITY.—The Common Hoopoe has been often kept, and is obtainable yearly; when hand-reared it is very tame, and can be allowed to fly loose. It has never bred in captivity.

DISTRIBUTION AND IMPORTANT SPECIES.—These birds inhabit the warm and temperate parts of the Old World; there are less than twenty species. The typical Hoopoes, which are all much like the common European bird, sandy, black and white, with a large, erectile, fan-shaped, cinnamon crest, range widely all across the Old World, except in the Australian region. The Common Hoopoe is migratory, but the more richly-coloured forms peculiar to the Indian region and Africa are resident. The crestless, long-tailed Wood-hoopoes are peculiar to Africa south of the Sahara; the best known is the Kakelaar (*Irrisor erythorhynchus*), a metallic-black, long-tailed bird, with the wings and tail marked with white, and scarlet bill and feet, which is a common and familiar species.

HORNBILLS (*Bucerotidæ*).

DIAGNOSIS.—*Perching birds of large size, with huge, usually curved, bills and four-toed feet, the two outer front toes united.*

SIZE.—From that of a hen turkey to that of a pigeon.

FORM.—*Bill* large, curved in profile, stout, usually surmounted by an excrescence in the adult; nostrils behind the base, corner of mouth below eye.

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Abyssinian Ground Hornbill (*Bucorvus abyssinicus*).
(*See p.* 64.)

In these birds the legs are of quite ordinary length, and they walk and run well.

Elate Hornbill (*Ceratogymna elata*).
(*See p.* 64.)

Exemplifying the short-legged tree-frequenting typical forms.

[*To face p.* 62.

Prevost's Humming-bird (*Lampornis prevosti*). (*See p.* 65.)
From a specimen which lived five weeks in the London Zoological Gardens.

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Felicia's Humming-bird (*Amazilia feliciæ*). (*See p.* 65.)
One of twelve specimens exhibited in 1907 in the London Zoological Gardens.
It is really much smaller than the species shown above.

Feet with shanks usually very short (long only in the Ground Hornbills), and the two outer front toes united; hind-toe well-developed. *Wings* with short primaries, but large altogether, having the upper- and fore-arm bones long, as in many water-fowl; *tail* long, rounded or wedge-shaped; *head* large, neck long, body meagre; thighs very prominent. Tongue very short.

PLUMAGE, COLOURATION, ETC.—Usually sombre, though strongly contrasted; black and white, sometimes grey, and sometimes partly chestnut. Sexes sometimes different, and young also differing at times. Bill and bare face often richly coloured. Upper eyelid furnished with eyelashes.

YOUNG.—Helpless, naked, and fed by parents. The casque or "horn" does not appear till some time after they are fledged.

NEST.—In most cases simply a hole in a tree, walled up by the female with her own dung, till only a slit is left, through which the male feeds her and the young. The Ground Hornbills, however, build an ordinary nest in a fork.

EGGS.—One or two only; white and spotless.

COURTSHIP.—Little known; in the Ground Hornbills the throat-wattle is expanded, the wings drooped and tail raised.

FOOD.—The short-legged tree-haunting species live mostly on fruit, and such small animals as they can capture; the ground-living forms subsist mainly on the animal diet. They hardly ever drink, and show little inclination even to bathe.

GAIT.—The tree species, which usually seldom visit the ground, move there by awkward hops; they also hop sideways along the boughs; the ground species walk and run freely.

FLIGHT.—Heavy, and in the large species noisy, performed either by continued flappings or by alternate

flapping and sailing; very jay-like in the small species. The neck and feet are stretched out.

Disposition and Habits.—They are wary and intelligent, and possessed of considerable affection for each other.

Note.—Unmusical and loud; often a positive bray or bellow.

Economic Qualities.—Some are said to be very good eating, and some are valued as scavengers. When they visit fruit gardens they are naturally very destructive, but this seldom happens.

Captivity.—They live well in this state, are easily fed, and when hand-reared, are remarkably tame and affectionate, delighting in being fondled and played with; indeed, they can be left at liberty without fear of their straying. None have ever bred in this condition, however, and they are very subject to defective feather-growth.

Distribution and Important Species.—The Tree Hornbills, of which there are about sixty-five species (*Bucerotinæ*), are found in Africa, south of the Sahara, and in South-East Asia to New Guinea, in wooded country; the Ground Hornbills (*Bucorvinæ*) are confined to Africa, where the species (two only) frequent open land, but roost on trees. These are as large as a turkey-hen, and mostly black, with long shanks. One has the casque open in front, while it is closed in the other.

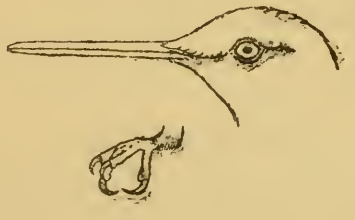
Among the Tree Hornbills the most familiar in India is the Grey Hornbill (*Ocyceros birostris*), about the size of a magpie, with narrow pointed casque on the bill; in South Africa the Red-billed Hornbill (*Tockus erythrorhynchus*), variegated with brown and white, and about the size of the above. At our Zoological Gardens the Elate Hornbill of West Africa (*Ceratogymna elata*) is usually on view, and does better than most species.

Humming-Birds (*Trochilidæ*).

Diagnosis.—*Very small perching birds, with slender bills and very short shanks.*

Size.—From that of a swallow to that of a large humble-bee. Some are the smallest of known birds.

Form.—*Bill* always slender—medium, long, or very long, usually straight; *feet* with very short shanks and four free toes, three in front and one behind; *wings* narrow and generally long, with the arm bones very short, most of the length being due to the primary quills; *tail* very varied in form; head large, neck long, body small but plump.



Head and foot of Giant Humming-Bird (*Patagonia gigas*).

Plumage and Colouration.—Feathering close and usually metallic, very commonly coloured green, the lustre often very intense; no seasonal change, but often a sexual difference. Young like the female.

Young.—Naked and helpless, with the bill short and broad at first.

Eggs.—Two; pure white.

Incubation.—Ten days, the hen only sitting.

Courtship.—The male plays on the wing with expanded tail.

Nest.—Suspended from a leaf or branch, to which it is fastened by one side; very neatly made of plant-down, spiders' webs, etc., and small even for the size of the birds.

Food.—Minute insects, etc., and nectar obtained from

flowers; they usually feed when hovering on the wing over the flowers.

GAIT.—They seem never to walk at all; when perching they sometimes move sideways along the twig, but usually sit still.

FLIGHT.—Very powerful and peculiar, by extremely rapid beats of the wing, so that a humming noise is often produced. They fly very quickly in a straight line, and excel all birds in power of hovering; but do not usually remain on the wing for long together.

NOTE.—A mere chirp or squeak; one species, the Vervain Humming-Bird (*Mellisuga minima*), is a singing bird, however.

ECONOMIC QUALITIES.—They are very ornamental and useful as insect-destroyers and flower-fertilizers.

DISPOSITION AND HABITS.—They are quarrelsome and unsociable, but show considerable intelligence. They have a curious trick of wiping the bill with one foot.

CAPTIVITY.—They have seldom been kept successfully for long, but several species have been brought to Europe and lived for some weeks at our Zoological Gardens, or even months elsewhere. Some substitute for their insect food should always be provided, as they cannot live long on syrup alone.

DISTRIBUTION AND IMPORTANT SPECIES.—The New World, chiefly in the southern half thereof; there are about five hundred species. Some species are migratory, and of these some even reach Alaska and Canada. Others range high up the Andes. The most generally known is the Ruby-throat (*Trochilus colibris*), of the United States and Canada, metallic green, with white underparts, and red throat in the male.

Ibises and Spoonbills (*Ibididæ*).

Diagnosis.—*Rather large waders, with long bills, curved throughout or expanded at the tip; all front toes webbed at the base, and well-developed hind-toe.*

Size.—From that of a crow to that of a goose.

Form.—*Bill* long, curved downwards and narrow throughout in Ibises, curved only at the tip and broadened and flattened there in Spoonbills; *feet* with long shanks, hind-toe well developed and resting on the ground, all front toes webbed at base. *Wings* large, rounded at tip; *tail* short. *Head* small, neck long.

Plumage, etc.—Colouration in masses, usually black, richly glossed, or white; sexes alike, but fledged young different. Sometimes a seasonal change. Face or head always showing some bare skin. Skin of under side of wings often bright scarlet.

Young.—Hatched downy and helpless, with short beaks of ordinary form; they thrust these into the mouths of the parents when being fed.

Nest.—A platform of sticks, etc., usually on trees, sometimes on rocks, reeds, or ground.

Eggs.—Several, spotted on a white ground, or plain blue.

Incubation.—About three weeks.

Courtship.—Attended with much croaking and erection of the expanded wings.

Food.—Insects, crustaceans, small fish, and suchlike; they eat some little vegetable food also.

Gait.—A walk; they seldom run, but can swim on occasion. They perch readily.

Flight.—Strong; performed by alternate flappings and sailings, with the neck and legs outstretched.

Note.—Harsh; a croak, cackle, or scream.

Disposition and Habits.—They are, generally speaking, sociable and harmless birds, frequenting,

usually, marshy places, though some Ibises feed on dry ground.

Economic Qualities.—They are useful vermin-destroyers, and some are good eating.

Captivity.—No waders thrive better in this condition, and several breed readily.

Distribution and Important Species.—These birds, numbering about thirty species, are found all round the world, chiefly in warm climates. The most widely distributed is the migratory glossy Ibis (*Falcinellus igneus*), found in both worlds, and a rare straggler to Britain. The White Spoonbill (*Platalea alba*) is also widely spread in the Old World, and used to breed here. The celebrated Sacred Ibis (*Ibis religiosa*), a white bird with a black, bare head, and filamentous black wing-plumes, is well known in Africa, being called Schoorsteen-veger (Chimney-Sweeper) at the Cape. A familiar species in South America is the Scarlet Ibis (*Eudocimus ruber*), whose name expresses its prevailing colour, which, however, fades in captivity.

Jaçamars (*Galbulidæ*).

Diagnosis.—*Perching birds, with long bills and small feet with two toes in front.*

Size.—From that of a thrush to that of a skylark.

Form.—*Bill* much like a kingfisher's, long, straight, and tapering, except in one species, the largest, and surrounded with bristles at the base; *feet* small, with very short shanks and two toes in front, united at the base, the fourth toe turned back with the hind one—sometimes the latter is missing, and the bird three-toed. *Wings* short. *Tail* rather long; head rather large.

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European Spoonbill (*Platalea leucorodia*). (*See p.* 68.)

In full plumage this species has a long crest and a black bill. [*To face p.* 68.

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Kagu (*Rhinochetus jubatus*).

The Kagu is about the size of a fowl, pale grey in colour, with orange-red bill and legs, and red eyes.

Kagu displaying. (*See p. 71.*)

The bird assumes this quaint attitude when approached.

PLUMAGE AND COLOURATION.—Feathering soft and lax, but, nevertheless, usually with rich metallic bronze-green gloss; a small sex-difference, the male's throat being usually white; no seasonal change.

YOUNG.—Presumably helpless.

NEST.—A hole in a bank, sometimes dug out by the birds,

EGGS.—White.

FOOD.—Insects, captured on the wing.

GAIT.—They seem to sit perched most of the time, not to hop or walk about.

FLIGHT.—Quick, but spasmodic.

NOTE.—They seem to be generally silent, but one sings.

DISPOSITION AND GENERAL HABITS.—They are solitary and sluggish birds.

ECONOMIC QUALITIES.—They are presumably of use as insect-destroyers.

CAPTIVITY.—I know of no record of any being kept, but as one was once shot at large in England, it must have been brought over, as it can hardly have arrived naturally.

DISTRIBUTION.—Warm parts of America, frequenting forests, near streams. There are about a score of species, not very familiar birds, but one, the Great Jaçamar (*Jacamerops grandis*), the largest of all and the only one with a curved bill, deserves notice.

JAÇANÁS (*Parridæ*).

DIAGNOSIS.—*Medium-sized marsh birds, with enormously long toes and claws, the latter straight.*

SIZE.—From that of a turtle-dove to that of a skylark.

FORM.—*Bill* somewhat pigeon-like, but with no bare swollen skin above nostrils, and corner of mouth not reaching back beyond forehead; *feet* with long shanks, legs bare above hock, and toes very long, with no webs at base, and with very long

straight claws, especially on the hind-toe. Head small, body plump; *wings* usually short and rounded, often spurred on the pinion-joint; *tail* usually short.

PLUMAGE AND COLOURATION.—Thick and soft; often showing metallic colour; no sexual difference, and a seasonal change only in one species, which is otherwise abnormal. Young, when fledged, different from adult.

YOUNG.—Downy and active, the down streaked above.

NEST.—A mass of rushes, etc., placed on floating vegetation.

EGGS.—Four; somewhat pear-shaped, glossy, usually marked.

COURTSHIP.—In the only species I have watched (*Hydrophasianus chirurgus*) the male simply approaches the female in a stooping position.

FOOD.—Insects and water snails, seeds and shoots of water plants.

GAIT.—A walk; they swim, but slowly, and can dive, using the wings under water.

FLIGHT.—By continuous beats of the wing; seldom protracted far. Legs and neck extended.

NOTE.—A mew or scream.

DISPOSITION AND HABITS.—They spend all their time on floating vegetation, on which they walk and stand with facility, owing to the long toes; they turn over the leaves for food. They are not very active, but decidedly pugnacious, fighting with bills and wings.

ECONOMIC QUALITIES.—They are exceedingly ornamental, and some at least are good eating.

CAPTIVITY.—They are not very easy to keep; only one species—the Pheasant-tailed—has reached Europe alive, and none have been bred.

DISTRIBUTION AND IMPORTANT SPECIES.—The Jaçanás, of which there are less than a dozen species, occur

all round the world in warm climates. They are not migratory. Perhaps the most familiar is an aberrant species, the Pheasant-tailed Jaçaná, or Water-pheasant (*Hydrophasianus chirurgus*), of India and the Oriental region generally, a species with long, mostly white wings, and in the breeding season a long black tail and black underparts. The other Indian species, the Bronze-winged (*Metopidius indicus*), is also well known; its body-colour is mostly black when adult. The familiar African form is the Lily-trotter (*Phyllopezus africanus*), chestnut brown, with white neck. The type of the family (*Jacana jacana*) is a South American bird, with black head, neck and underparts, mahogany-red back, and greenish-yellow quills.

Kagu (*Rhinochetidæ*).

Diagnosis.—*A ground-bird with rather long bill and nostrils overhung by a scroll-like covering.*

Size.—About that of a fowl.

Form.—*Bill* rather long, strong, with nostrils covered as above, mouth cleft nearly to eye; *feet* with long shanks, transversely scaled, no webs at base of front toes, hind-toe short and useless; *wings* short and rounded; *tail* moderate. Head and eyes large.

Plumage and Colouration.—Feathering very powdery, pale grey; primary quills barred boldly with black, brown and white. No sex difference or seasonal change. Young pencilled with brown.

Young.—Downy, the down variegated.

Eggs.—One only; spotted.

Incubation.—Thirty-six days.

COURTSHIP.—The bird often draws itself up and expands its crest, probably a courting gesture.

FOOD.—Worms, snails, etc.; it often digs with the bill.

GAIT.—A walk or run.

FLIGHT.—Seemingly very weak; in captivity it seems not to try to fly.

DISPOSITION AND HABITS.—It is a lively, playful bird, fond of rushing about, running after its tail, etc. Though nocturnal in the wild state, in captivity it is active by day. It bathes freely.

NOTE.—A curious inward trumpeting sound.

ECONOMIC QUALITIES.—It is eaten in its native country, and must be useful in destroying vermin.

CAPTIVITY.—It does well in confinement, feeding on meat, and has laid in the London Zoo and elsewhere.

DISTRIBUTION.—New Caledonia only; there is only one species (*Rhinochetus jubatus*), said to be in danger of extinction.

KINGFISHERS (*Alcedinidæ*).

DIAGNOSIS.—*Perching birds, of medium or small size, with large straight beak and three or four toes; a hind-toe and two or three, more or less united, in front.*

FORM.—Bill usually long, stout, straight (hooked at tip only in *Melidora*), corner of mouth under eye; *wings* short; *tail* various; head large; *feet* very small, with very short shanks and inner front toe sometimes wanting; two outer front toes united.

SIZE.—From that of a crow to that of a tit.

PLUMAGE AND COLOURATION.—Much varied in colour, often showing much rich glossy blue or green.

Sexes similar or different; young much like adults, the sexual difference, if any, appearing at once; rarely a distinct young plumage.

YOUNG.—Naked and fed by parents; when the pen-feathers are growing they present a remarkable appearance, the feather-sheaths being like dull silver. They run backwards more readily than forwards.

NEST.—A hole in a bank or dead tree, often burrowed out by the birds themselves.

EGGS.—Several; roundish, pure glossy white.

INCUBATION.—Two to three weeks.

COURTSHIP.—The tail is raised and the wings slightly drooped, in such species as I have been able to watch (*Alcedo ispida* and *Halcyon smyrnensis*).

FOOD.—Small animals, some species diving for fish, crustaceans, etc.; while others feed on insects, mice, snakes, etc., and others are both land and water feeders. They throw up pellets composed of the bones, scales, etc. Fruit has been seen to be eaten in the case of two species.

GAIT.—They seldom move about much, and most do so by a waddling walk, though a few hop. Generally they remain for a long time on one perch. They rise after a plunge by a violent flap of the wings, and can swim in this way.

FLIGHT.—Generally direct, light and jay-like in the larger species; swift and darting, with rapid action of the wings, in the small ones. They not only plunge in some cases for their food, but bathe by plunging.

DISPOSITION AND HABITS.—They seem not very intelligent, owing doubtless to their uniform and lazy way of life, which is mostly passed in waiting for prey to appear. They are usually pugnacious and live solitary.

NOTE.—A piping sound, or a cackle, often very harsh;

in the Australian "Laughing Jackass" (*Dacelo gigas*) very like a coarse laugh.

ECONOMIC QUALITIES.—The land-feeding species are useful vermin-destroyers; the fish-eaters are injurious in fish-rearing establishments, but not elsewhere, and they are always appreciated as ornaments to scenery.

CAPTIVITY.—They are easy to rear on fish and meat, but unless in a large aviary do not usually do well when fledged, knocking themselves about. The "Laughing Jackass" is the only species commonly kept, and lives well. It has hatched young three times in the London Zoological Gardens.

DISTRIBUTION AND IMPORTANT SPECIES.—Kingfishers, of which there are about a hundred and fifty species, are found all over the world, but the land-feeding species are confined to the warmer parts of the Old World; few species of any kind inhabit temperate climates. The only one common in Europe generally is our well-known *Alcedo ispida*, which extends all across Asia, being common in India, and in North America the grey-and-white *Ceryle alcyon;* while the "Laughing Jackass" is familiar in zoological gardens; in colour it is chiefly brown and dull white. The black-and-white *Ceryle rudis* is a common bird in India and Africa, as is the blue-and-buff *Halcyon vagans* in New Zealand.

KIWIS (*Apterygidæ*).

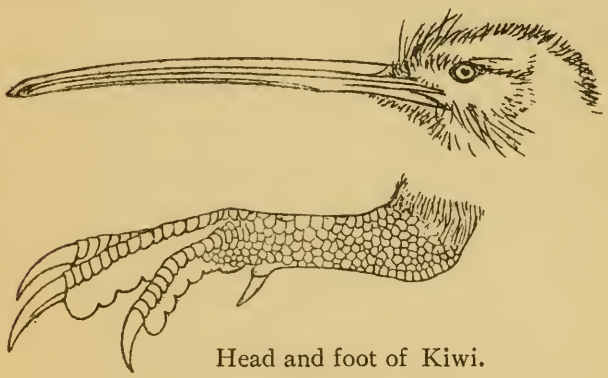
DIAGNOSIS.—*Flightless birds of moderate size, with very long bills and very small wings.*

SIZE.—About that of a fowl; females larger than males.

FORM.—*Bill* long, straight, slender, with nostrils at the tip, and corner of mouth below eye, whiskered

at base; head and eyes small, neck rather long. *Feet* with short stout shanks, and three front toes without basal web, and a small rudimentary hind-toe set on above the level of the rest; thighs large and stout. *Wings* smaller than in any other bird, bent permanently at the elbow, and not easily seen; they are furnished with a claw at the tip and with minute soft quill-feathers. No external *tail*, but oil-gland present.

PLUMAGE.—Very lax and hairy-looking; no sexual difference; but the females are larger.



Head and foot of Kiwi.

YOUNG.—Active and feeding themselves, clad in uniform-coloured hairy-looking down.

NEST.—In a burrow dug out by the female with her feet.

EGGS.—Two, white, of enormous size in proportion to the bird.

INCUBATION.—Said to be six weeks, the male only sitting, or rather lying *across* the eggs.

FOOD.—Worms, insects, and berries; gravel is taken to aid digestion. They jerk food down the throat like an ostrich.

GAIT.—A walk or a quick run.

NOTE.—A prolonged double whistle, whence the name Kiwi (kee-wee).

Disposition and General Habits.—Being nocturnal, these birds seem stupid by day. They are, however, tameable. They fight with each other, and with a captor, striking with their sharp claws. The females are fiercest. They can see but little, even at night, but have an acute sense of smell.

Economic Qualities.—The flesh is edible, and the feeding habits are likely to be of economic use in the destruction of vermin.

Captivity.—They do well in captivity, feeding on minced meat or, indeed, almost any soft food. They have laid eggs in confinement, but not hatched them.

Distribution and Species.—New Zealand, where four species are found: the Roas (*Apteryx mantelli*, *A. australis*), with brown plumage, with lighter longitudinal streaks, and the Kiwis proper (*A. oweni*, *A. haarsi*), with barred grey plumage, coloured much like that of a "Plymouth Rock" fowl.

Limpkins (*Aramidæ*).

Diagnosis.—*Large rail-like birds, with the first quill having a peculiarly narrowed inner web, and bill slightly curved to one side at the tip.*

Size.—About that of a large fowl.

Form.—*Bill* long, with the nostrils central; *feet* with long shanks; front toes long, with no webs at the base, hind-toe rather short; *wings* of moderate size; *tail* short. Neck and thighs long.

Plumage, etc.—General colour brown, with bronzy white streaks; no sex-difference or seasonal change.

Young.—Downy and active, the down black in colour.

Nest.—Open, made of rushes, etc.

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Mantell's Apteryx or Roa (*Apteryx mantelli*). (*See p.* 76.)

This large species of *Apteryx* is brown with lighter streaks. The wings cannot be seen unless the bird is handled.

[*To face p.* 76.

Photo copyright by W. S. Berridge, F.Z.S.

Buff Laughing Kingfisher (*Dacelo cervina*). (*See p. 74.*)

This species is slightly smaller than the common Laughing Jackass, with a buff breast and bright blue on the wings and back.

EGGS.—Several ; spotted, as in rails.

FOOD.—Chiefly animal—snails, worms, etc.

GAIT.—A stately walk.

FLIGHT.—Performed with very powerful flappings.

NOTE.—A loud distressful-sounding scream.

DISPOSITION AND HABITS.—A shy, retiring, solitary bird, inhabiting marshes. It has the habit of jerking its tail up as rails do, and also perches like them.

ECONOMIC QUALITIES.—It is good eating.

CAPTIVITY.—The southern species has been exhibited in our Zoological Gardens.

DISTRIBUTION AND SPECIES.—There are only two species, confined to the warm parts of America, *Aramus pictus* of the northern part of this range, and *A. scolopaceus* of South America, known in the Argentine as " Vidua loca " (Crazy Widow). They are much alike, but the northern is more streaked.

MESITES (*Mesitidæ*).

DIAGNOSIS.—*A rather small ground-bird, with small head, short wings, large tail, all three front toes without webs, and hind-toe rather smaller than middle.*

SIZE.—About that of a tame dove.

FORM.—*Bill* rather short and slight, with long nostrils extending from base to middle, corner of mouth under front of eye. *Feet* with rather long shanks, no webs to front toes ; hind-toe well developed, but shorter than middle one. *Wings* short, round and soft. *Tail* rather large and rounded. *Head* small.

PLUMAGE AND COLOURATION.—Chestnut-brown, the male being white below, with black spots.

NEST.—On the ground, made of leaves, rushes, or twigs.

FOOD.—Insects, etc.

GAIT.—A walk or run.

FLIGHT.—The species is said to be incapable of flying.

NOTE.—A sound like "hoo-hoo"; but they also have a call-note of several syllables.

DISPOSITION AND HABITS.—They are said to be so attached to their young that if these be taken they will follow the captor home.

ECONOMIC QUALITIES.—They are probably useful as insect-destroyers.

DISTRIBUTION AND IMPORTANT SPECIES.—Madagascar, in the forests of the eastern slope of the mountain-chain. There is only one species (*Mesites variegata*), which is little known, though not rare in its own country.

MOTMOTS (*Momotidæ*).

DIAGNOSIS.—*Perching birds, with saw-edged bill curved in profile, and three front toes more or less united.*

SIZE.—From that of a lark to that of a jay.

FORM.—*Bill* curved in profile, toothed along the edges, corner of mouth below eye; *feet* with rather (but not excessively) short shanks, and three toes, more or less united, in front, the hind toe smallest. *Wings* short and rounded; *tail* long, especially the centre feathers. Head large.

PLUMAGE AND COLOURATION.—General hue green, the head diversified with blue and black. No sex difference or seasonal change.

YOUNG.—Helpless, and fed by parents, presumably.

NEST.—A hole in a bank or tree.

EGGS.—White with a yellowish tinge.

FOOD.—Insects and fruit.

GAIT.—They hop when on the ground, but usually perch, and do not move about much on foot.

FLIGHT.—Easy, but not protracted far.

NOTE.—A sort of hoot, like "hoo-too," whence the name "Houtou" sometimes applied to some of them.

DISPOSITION AND GENERAL HABITS.—They are solitary, and not very active, but have some curious traits. Some of the larger species bite away the webs of their central tail-feathers for about an inch near the tip, producing a "racket-shaped" end. They often swing their tail from side to side like a pendulum, and then jerk it up over the back.

ECONOMIC QUALITIES.—Of no particular importance; they no doubt do good in destroying insects.

CAPTIVITY.—They have done well at the London Zoological Gardens.

DISTRIBUTION AND IMPORTANT SPECIES.—The two dozen species of this family are confined to the warm parts of America, where they inhabit forests. None can be called familiar birds, but the Brazilian Motmot (*Momotus brasiliensis*) is perhaps the best known; this and *M. subrufescens* having been the species kept in London. The small species, with comparatively shorter tails, form the genus *Hylomanes*.

MOUND-BIRDS (*Megapodidæ*).

DIAGNOSIS.—*Fowl- or partridge-like birds with the two inner front toes, only, connected at the base by a short web, and well-developed hind-toe.*

SIZE.—From that of a fowl to that of a partridge.

FORM.—*Bill* much as in a fowl, but with round open nostrils; *feet* strong, with long, nearly straight claws, the two inner front toes united by web at

the root, and hind-toe large and set low; *wings* short and rounded; *tail* medium to short.

PLUMAGE.—Usually sombre, brown or black, and never brilliant. Head often with more or less bare red skin. No sexual difference or seasonal change, and young much like adults.

YOUNG.—Active and feeding themselves, and hatched with wings fully fledged, so that they fly strongly at once and live independently from the first.

NEST.—The eggs are laid either in a mound of vegetable refuse, and scratched up by the birds, or are buried by them in sand. When scratching, the birds do not rake, but seize what they are working in in footfuls, so to speak, and throw it backwards.

EGGS.—Very large for the size of the bird; spotless, white or pinkish.

INCUBATION.—The eggs take six weeks to hatch; there is no incubation, the heat of the mound sufficing; the male, however, turns and airs the eggs.

COURTSHIP.—In the Brush-Turkey the male expands a brilliant yellow wattle at the base of his neck.

FOOD.—Herbage, grain, insects, etc.

GAIT.—A walk or run.

FLIGHT.—Heavy and short; but some small species seem to be able to make fairly long flights, such as from island to island.

DISPOSITION AND GENERAL HABITS.—They seem somewhat spiteful and quarrelsome, but not much is known.

NOTE.—Loud and harsh; in the male Brush-Turkey a boom.

ECONOMIC QUALITIES.—Their flesh and eggs are good; if they were domesticated they would be valuable poultry, owing to their early maturity.

CAPTIVITY.—They live well, and one species, the Brush-Turkey (*Catheturus lathami*) not unfrequently breeds.

DISTRIBUTION AND IMPORTANT SPECIES.—The Nicobars to Australia and the Pacific Islands. There are about two dozen species, of which the best-known is the above-mentioned Australian Brush-Turkey, a sooty-brown bird as big as a fowl, with bare red head and fowl-like tail.

MOUSE-BIRDS OR COLIES. (*Coliidæ*).

DIAGNOSIS.—*Small long-tailed tree-birds, with four-toed feet, the toes with no special direction.*

SIZE.—About that of a sparrow, exclusive of the long tail.

FORM.—*Bill* short, stout, upper outline arched, corner of mouth below front of eye; *feet* with short shanks and four strongly-clawed toes, the first and fourth sometimes directed forward, sometimes backward; *wings* short and rounded; *tail* long and graduated; head always crested.

PLUMAGE.—Soft and loose, drab in colour, almost uniform. Feet and base of bill often red. No sexual or seasonal difference; young like parents.

YOUNG.—Naked and helpless.

EGGS.—Several; pure white or spotted with red.

NEST.—A simple open structure of twigs in a bush.

FOOD.—Fruit and buds, sometimes insects.

GAIT.—They seldom leave the trees, where they creep about like mice, resting on the whole shank, and clinging in any position, sleeping back downwards; on the ground they hop, resting on their hocks still.

FLIGHT.—Weak, effected by alternate fluttering of the wings and skimming.

NOTE.—A harsh chatter.

DISPOSITION AND GENERAL HABITS.—Very sociable, always in flocks. They sleep huddled together.

ECONOMIC QUALITIES.—They are destructive birds where fruit is grown, but esteemed as food by the Kaffirs.

CAPTIVITY.—They are seldom seen in this condition, but are easy to keep. They have not been bred.

DISTRIBUTION AND SPECIES.—Africa, south of the Sahara, in wooded and bushy country. There are fourteen species, very similar in general appearance.

NIGHTJARS (*Caprimulgidæ*).

DIAGNOSIS.—*Birds with very small beak and wide mouth, and small feet, with all front toes joined at base.*

SIZE.—From that of a pheasant to that of a lark.

FORM.—*Beak* very small, with tubular nostrils and corner of the wide mouth beneath eye; *feet* with short shanks, and all front toes webbed at base; hind-toe small. *Wings* usually long; *tail* various, generally rather long. Head large and flat, with large eyes; neck short; body very small.

PLUMAGE.—Feathering soft, very minutely variegated, producing a bark-like effect, in drab or brown; little sex-difference, when any is present, and no seasonal change; young much like adults. Bristly feathers along the mouth commonly found, and some of the wing-feathers abnormal in certain species.

YOUNG.—Downy, and capable of some activity, but fed by the parents. Down variegated, pattern protective.

NEST.—None; the eggs being laid on the bare ground.

EGGS.—Two; variegated, resembling pebbles.

INCUBATION.—About a fortnight.

FOOD.—Insects, generally captured on the wing.

GAIT.—A walk or hop; but they seldom move much on foot. When perching, they sit along the bough, not across it.

FLIGHT.—Very light and easy; most of their active life is spent on the wing.

NOTE.—Remarkable and characteristic, and varying much according to the species; often like articulate sounds.

DISPOSITION AND HABITS.—The birds being generally nocturnal, these are not much known. They are usually solitary, and keep quiet by day. Some have a habit of making a noise by clapping their wings together in flight.

ECONOMIC QUALITIES.—Nightjars are some of the most useful of birds as insect-destroyers, and do no harm whatsoever.

CAPTIVITY.—They are difficult to keep, as they generally refuse to feed themselves; but our species (*Caprimulgus europaeus*) has been maintained for some time.

DISTRIBUTION AND IMPORTANT SPECIES.—Nightjars, of which there are about a hundred and twenty species, are found all round the world, chiefly in the tropics; those of temperate climates are migratory. Their notes afford the most striking distinction; the purring sound produced by the European species is well known, also the "chook-chook," resembling a stone sent skimming over ice, of the common Indian species (*Caprimulgus asiaticus*), and the curious calls of the American Whip-poor-Will (*C. vociferus*) and Chuck-Will's-widow (*C. carolinensis*). The Night-hawk (*C. popetue*), also American, is to a great extent a diurnal species.

Ostriches (*Struthionidæ*).

Diagnosis.—*Two-toed birds of gigantic size and incapable of flight.*

Size.—The largest of living birds, standing seven or more feet high.

Form.—*Bill* short, straight, flat; the corner of mouth beneath centre of eye. *Legs* with the thigh (really the tibial segment) prominent and very stout; shank long and stout; two toes only present (the third and fourth), the inner largest and alone provided with a claw; the toes are united at the base by a web, and the basal joints are raised above the ground when the bird walks, a unique peculiarity in the class. *Wings* small, only bent at the elbow, clawed on the first two fingers, and carried loosely. Neck exceedingly long, body meagre. *Tail* well feathered.

Foot of Ostrich.

Plumage.—Loose and decomposed, even the quills of the tail and wings; there are no feathers under the wings, or on the sides and thighs, and on the head and neck only hair-like ones. Hair-like feathers

also form eyelashes. Male black and white, female drab. Young mottled with buff.

YOUNG.—Active and feeding themselves. The head and neck clothed with grey down marked with black, the body with bristly- or spiny-looking down.

NEST.—A hollow scratched out in the sand by the male.

EGGS.—Numerous, creamy-white, rounded ovals, highly polished.

INCUBATION.—Lasting about six weeks, the male sitting by night, the female by day.

COURTSHIP.—The male, when courting, bellows, inflating his neck, and raising his wings above his back to a perpendicular position. He also rolls his head and wings from side to side.

FOOD.—Chiefly grass and other herbage, with various small animals. Any sort of hard substance is taken to assist digestion.

GAIT.—A fast springy walk or run, the latter being the swiftest gait among land animals. Ostriches can also swim well if pressed. The wings are, of course, quite useless for flight, and do not even aid in running.

NOTE.—Usually a hiss, but the male bellows, or "broms," in the breeding season.

DISPOSITION, HABITS, ETC.—Ostriches are stupid and nervous, though tameable; they are very fond of "waltzing," especially when young. The male is very dangerous in the breeding season, when he fights his own sex and other animals, including man, striking forward and downward with one foot.

ECONOMIC QUALITIES.—The soft filmy wing- and tail-quills of ostriches, especially the males, have always been favourite objects for decoration.

CAPTIVITY.—The ostrich has been completely domes-

ticated both at the Cape and elsewhere, in order to obtain its plumes regularly. No distinct breeds, however, have as yet been formed.

DISTRIBUTION AND SPECIES.—Africa and Arabia, in open sandy tracts. Several local forms are described, but it is doubtful if the differences are of specific importance. The typical *Struthio camelus* is the North African race.

OWLS (*Strigidæ*).

DIAGNOSIS.—*Perching birds, with short hooked bill and bristled or feathered toes not united by webs at the base; the fourth toe with a backward inclination.*

SIZE.—From that of a sparrow to that of a hen turkey.

FORM.—*Bill* short, strong, hooked, with a cere at base, corner of mouth extending to below eye; face broad, covered with bristly feathers, which usually conceal the base of the bill, and usually surrounded by a frill or ruff of small stiff feathers; *feet* strong, with medium or short shanks, usually feathered, with four toes, all powerfully clawed, the hind-toe smallest, the fourth or outer front one always turned rather back, especially in perching; *wings* short to very long, rounded; *tail* medium or short; *head* large, in many species furnished with two crests, the so-called "horns" or "ears"; body light.

PLUMAGE.—Very soft, sombre in colour, usually grey or brown, often finely variegated. No sexual difference, and seldom a distinct young plumage; but the hens are usually larger, and there is much individual variation, many species showing light and dark, or grey and reddish, forms.

YOUNG.—Helpless and fed by parents, clad in very

fluffy down, at first white in colour, but afterwards sometimes buff, grey, or even sooty. A nestful often shows very different sizes, owing to hatching at different times.

NEST.—None as a rule, the eggs being laid in a hole of a tree, rock, or building, on the ground, or in the nest of some other bird.

EGGS.—Several; glossy, spotless white.

INCUBATION.—About a month.

COURTSHIP.—The Tawny Owl bows and spreads its tail like a pigeon.

FOOD.—Small vertebrates, especially rats and mice; rarely fish; but often insects. They cast up pellets of the indigestible parts. They seize and hold their prey with the feet.

GAIT.—A walk, usually awkward, with occasional hops. Some species run well, and all perch freely on occasion, though some naturally live away from trees.

FLIGHT.—Soft and noiseless, but not very fast as a rule. Some at any rate soar strongly, and some small species have an undulating flight. The feet are extended behind.

DISPOSITION AND HABITS.—They have been credited with the opposite qualities of wisdom and stupidity. Their awkward-looking movements of the head suggest the latter, and also that they are dazzled by light; but they can really see well in the day, and are quite as intelligent as hawks, and more courageous. They often lay up superfluous food for future occasions. They bathe and dust, but seldom drink.

NOTE.—Commonly unpleasant, a screech or howl; but very varied, the "hoots" of some being musical enough.

ECONOMIC QUALITIES.—No birds are as a family more useful or deserving of protection, owing to their destruction of vermin; but some of the large

Eagle-Owls are seriously destructive to game and poultry. A few are eaten locally.

CAPTIVITY.—They bear captivity excellently, and often breed in that condition; the great Eagle-Owl (*Bubo maximus*) has been thus bred for several generations.

DISTRIBUTION AND IMPORTANT SPECIES.—There are about three hundred species of Owls, and they are found all over the world. Some individual species, as the Barn-Owl (*Strix flammea*) and the Short-eared Owl (*Asio brachyotus*) are also almost world-wide in distribution; the latter is also migratory—a rare habit in the family. Besides the Barn-Owl, the Brown Owl (*Syrnium aluco*) is common in Britain and Europe generally. The Little Owl (*Athene noctua*), a small species about as big as a blackbird, spotted brown-and-white, is a very familiar Continental form, now locally common in England by introduction; in India the very similar *A. brama*, barred instead of streaked below, replaces it. The Barn-Owl is often called Screech-Owl, but the Screech-Owl of North America is a small "horned" species (*Scops asio*). An Eagle-Owl (*Bubo virginianus*) is also a well-known American species; and the commonest Owl at the Cape (*Bubo maculosus*) also belongs to the Eagle-Owl group. The Burrowing Owl (*Speotyto cunicularia*) inhabits the plain districts of America; it is much like the Little Owl of the Old World, but with longer legs.

PARROTS (*Psittacidæ*).

DIAGNOSIS.—*Pair-toed birds with a very short, strongly-hooked beak, with movable upper jaw.*

SIZE.—From less than a tit to that of an ordinary fowl, approximately.

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Australian Barn Owl (*Strix flammea delicatula*). (*See p.* 88.)

This race is of large size and has hardly any buff, but very distinct white spots and pure white breast. The attitude is characteristic of an Owl at bay.

[*To face p.* 88.

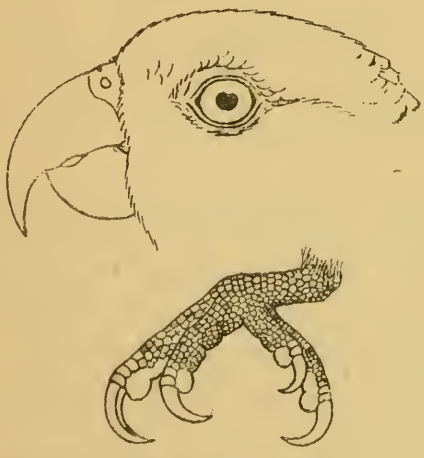
Photo copyright by W. S. Berridge, F.Z.S.

Kakapo *or* **Owl Parrot** (*Stringops habroptilus*). (*See p.* 90.)

The Kakapo is about the size of the familiar White Cockatoo, but with much smaller wings; its plumage is green, speckled with yellow and black.

FORM.—*Bill* very short, strongly hooked, with a cere at the base; *feet* with the shanks short or very short, always covered with many small scales, and four well-developed toes, the first and fourth turned back, the second and third forward; no webs; *wings* varying from short to long; *tail* short to very long. Head large; neck short; body small.

PLUMAGE AND COLOURATION.—Firm, and often powdery; colour very variable, usually brilliant; the prevailing



Head and foot of Parrot.

colour is grass- or leaf-green, olive-green and brown being rare. Grey, black, and white are found, also red, yellow, blue, and purple. A metallic gloss is hardly ever to be seen. No seasonal change; sexual differences comparatively rare. The young usually resemble the adult female, but have darker eyes; but some have a distinct immature plumage.

YOUNG.—Very helpless, naked at first, afterwards sometimes clothed in fluffy down without markings; they are fed by the parents, placing their bills in those of the latter.

NEST.—Usually none, a hole being dug out in a tree or bank, or an already existing one taken advantage of.

A few species of Love-birds (*Agapornis*) line the nest with shreds of bark, and one, the Quaker Parrakeet (*Myiopsittacus monachus*) makes communistic nests of twigs, inhabited by several pairs, each of which has its own apartment.

EGGS.—Two or more ; white, glossy, and unspotted.

INCUBATION.—Sixteen days (Budgerigar) to twenty-five days (Blue-and-yellow Macaw).

COURTSHIP.—Demonstrative, the tail being usually spread, but not raised, and the wings slightly opened ; but the attitudes vary ; the Cockatoos raise the wings and lower the head with erected crest.

FOOD.—Mainly vegetable, and procured in trees ; seeds, fruit, buds, and honey and pollen being eaten. Many seed-eaters feed on the ground on grass-seed, some on roots. Insects, chiefly wood-boring grubs, seem to be eaten a good deal.

GAIT.—Usually an awkward waddle, few species coming much to the ground ; but the Lories hop when there. The species which habitually feed on the ground, like some Cockatoos and Parrakeets, run about as actively as pigeons. In the boughs all use their beaks in climbing about from place to place.

FLIGHT.—This varies a great deal, in the rapidity of the wing-strokes, which are usually quick, and in the speed, which is usually considerable. They sail at times, but not very far. One species, the Owl Parrot, of New Zealand, is flightless. The feet and neck are extended in flight.

NOTE.—Usually a scream, sometimes very harsh ; but many have quite mellow voices. In captivity many, if not most species, display a great imitative

capacity, and their fame as talkers is very ancient; but they do not seem to be mimics in a wild state, curiously enough.

Disposition and Habits.—Their intelligence is well-known, as also their malice and spitefulness; but in spite of the latter quality they are usually social. They differ from most perching birds in not bathing in many cases, though enjoying rain.

Economic Qualities.—They are often extremely destructive to grain and fruit crops; but they do some good by devouring grubs and seeds of weeds. Many are eaten locally, and there is, of course, a great demand for them as cage-birds.

Captivity.—For ages Parrots have been most familiar cage-birds, as none thrive better in this condition; many have bred, especially the small long-tailed "Parrakeets," some of which propagate regularly, but only one, the Budgerigar (*Melopsittacus undulatus*) can be called completely domesticated.

Distribution and Important Species.—Parrots, of which there are about five hundred species, are found all round the world, chiefly in warm climates, and especially in tropical America, whence come the Macaws (*Ara*) and Amazons (*Chrysotis*), and in the Australian region, to which last the brush-tongued Lories (*Loriinæ*) and the crested Cockatoos (*Cacatuinæ*) are confined. A few range into temperate climates, in New Zealand, North America, and southern South America. They are hardly ever migratory, and some are much localized; indeed, several have become extinct in modern times.

Of the typical Parrots, the familiar Grey Parrot (*Psittacus erithacus*) is a common and widely-ranging species in Equatorial Africa; but Africa, as a whole, has but few species of Parrots, and

the same applies to Continental Asia. The most abundant Asiatic species is the green Ring-necked Parrakeet (*Palæornis torquatus*) of India and adjoining countries, the only one of the family which comes into towns ; a scarcely distinguishable race of this (*P. docilis*) extends across Africa, so it may claim to be the commonest of the family, and is, besides, a familiar cage-bird. The Rosella (*Platycercus eximius*), a species about the size of a dove, and exhibiting all the colours of the rainbow, is a very familiar Australian bird, and breeds in captivity. In New Zealand, the mountain-haunting Kea (*Nestor notabilis*), a bird about the size of a crow, olive-green, with a long bill, has attained notoriety by its attacks on sheep ; this and the forest-haunting brown Kaka (*N. meridionalis*) form a group by themselves. The most familiar of the Cockatoos are the Rose-breasted or Galah (*Cacatua roseicapilla*), about as large as a wood-pigeon, with a grey back, and the large white Sulphur-crested Cockatoo (*C. galerita*), both Australian. The Lories are less familiar ; but one, the Blue Mountain Lorikeet (*Trichoglossus novæ-zealandiæ*), of the size of a dove, with purple head, flame-coloured breast, and green upper parts, is familiar both wild in Australia and in captivity.

Passerine Birds (*Passeridæ*).

Diagnosis.—*Birds with the hind-toe and claw as large as, and usually larger than, any of the front ones.*

Size.—From about three inches long to the size of a fowl.

Form.—*Bill* very variously formed, but with the nostrils near the base and the corner of mouth below front

of eye; *feet* slight, with shanks never excessively long, and covered with few and large scales, all three front toes generally present and free, hind-toe with claw usually larger than any of them; *wings* varying, but always with the upper- and fore-arm segments short; *tail* varying, usually of twelve feathers, and very commonly more or less forked, usually of fair length. Head large; body light.

PLUMAGE AND COLOURATION.—Feathering soft, very varied in colour; olive-green (rare in other families) and brown being the commonest tints, though all others found in birds occur; often a sex-difference or a seasonal change, the latter usually in males only. Young sometimes like adults, sometimes with a distinct plumage, which is generally spotted or streaked.

YOUNG.—Helpless and either naked or but scantily provided with hairy-looking down, except in Lyre-birds; they gape for food, and the inside of mouth thus revealed is often brilliantly coloured; corners of mouth soft and expanded.

NEST.—Varying much, but always more or less elaborate; most often an open cup, but frequently domed, and often hanging. Some build mud nests, and some burrow; but all these usually line their nests, unlike most other hole-building birds.

EGGS.—Smooth and oval; two or more in number, self-coloured or spotted; even in allied forms there is often much difference, more than in whole families elsewhere.

INCUBATION.—Twelve days to three weeks.

COURTSHIP.—Various, and not so often noticeable as in other groups as a rule. Puffing out of the feathers is a common form of display.

FOOD.—Most commonly insects and other small animals, and berries; some eat seeds and herbage,

but almost all feed the young chiefly on insects and such-like, whatever the adult diet may be.

GAIT.—Generally a hop, but some ground-feeding forms, and the aerial Swallows, walk; some, as the large Thrushes, both walk and hop; most species move very actively among boughs, and all can perch on occasion. The Dippers (*Cinclus*) can swim and dive.

FLIGHT.—Generally undulating and very characteristic, the wings being alternately closed, causing a drop, and then rapidly moved; but the large species flap regularly. The neck is drawn in and the feet tucked up in front during flight.

NOTE.—Extremely varied, and often very melodious, nearly all singing-birds belonging to this family; many have great imitative powers, and exercise these even in a wild state, while some can be taught to talk when tamed, such as the Starlings.

DISPOSITION AND GENERAL HABITS.—They are the liveliest and most active of all birds, and often very intelligent; some are solitary, others social; most keep near cover. Many are pugnacious; in fighting they do not use the wings, only grappling with the claws and pecking.

ECONOMIC QUALITIES.—Most are useful insect-destroyers, especially so as, being chiefly perchers, they feed on insects other birds do not reach; some seed- and fruit-eating species are often destructive, but the former do good also by destroying seeds of weeds. Some are used as food—many, indeed, on the Continent.

CAPTIVITY.—Most cage birds, other than parrots, belong to this family; but they are not very free breeders in captivity as a rule, and only three species have been domesticated, all Finches—the Canary (*Serinus canaria*), the Java Sparrow (*Munia oryzivora*), and the Sharp-tailed Finch or

Bengalee (*Uroloncha acuticauda*). A white breed of the Jackdaw (*Coloeus monedula*) appears to exist on the Continent.

Distribution and Important Species.—The Passerine birds comprise more than half the known species of the bird class, and are in most countries the most numerous in species and individuals; they are found all over the world; a large number are migratory. Few individual species, however, have the wide distribution often found in other groups; the most widely-ranging bird of the family is our Sand-martin (*Cotile riparia*), found, according to season, all over the northern hemisphere.

The numerous subdivisions of this huge family are commonly treated as families, but this is misleading, as they are only of subfamily value. With the exception of a few, such as the Swallows, they are very difficult to define exactly, their limits being in many cases quite undefined, and being differently assigned by different authors. The arrangement given below—in which the subfamilies are arranged in alphabetical order—may be taken as fairly representing the usual view of what are distinct groups and what species may be assigned to them. But to learn the sub-groups of Passerine birds it is before everything necessary first to make the acquaintance of typical species of the various divisions, such as those given under each heading.

American Warblers (*Mniotiltinæ*) are small delicately-shaped birds of, usually, tree-haunting and insectivorous habits, much like the Old World warblers in form and size; but they show gay and varied colours, and as they are only found in the New World, are the less likely to be confused with the true Warblers. They

appear to grade into the Tanagers (*Tanagrinæ*) on the one hand and the Sugar-Birds (*Cærebinæ*) on the other. Their nests are open and cup-shaped as a rule.

They are usually migratory, the majority breeding in the Northern portions of the American Continent.

The most familiar species is the Golden Warbler (*Dendroica aestiva*), olive-green, with bright yellow head and underparts.

The Black-and-white Creeper (*Mniotilta varia*) gets its name from its colours and habits; it is a climbing species. The so-called American Redstart (*Setophaga ruticilla*) is one of this subfamily; it has the base of the tail and a bar on the wings richly coloured, red in the male, yellow in the female.

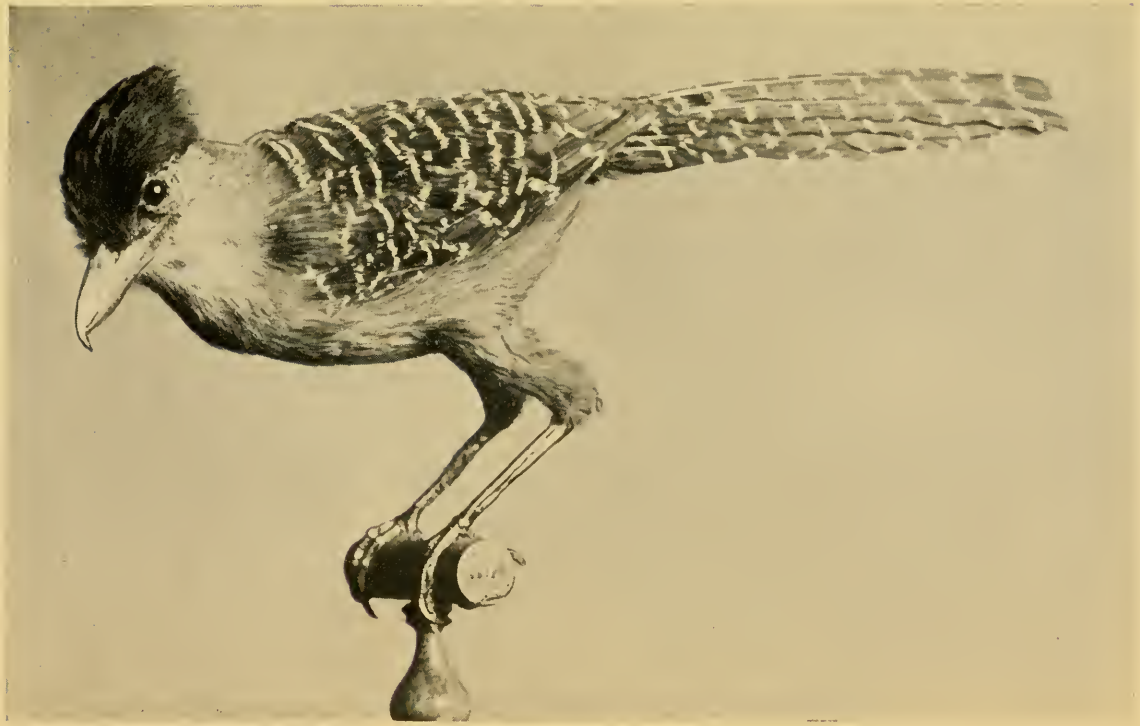
The Water-thrush (*Seiurus naevius*) is much like a Pipit in appearance, gait and actions, but olive above and faint yellow below.

The Oven-Bird (*Seiurus auricapillus*), not to be confused with the true Oven-Bird of South America, much resembles a small Song-thrush, with a rusty crown and black eyebrows.

These two last species walk instead of hopping.

All the above birds but the Black-and-white Creeper have been exhibited in the London Zoological Gardens, where they arrived by exchange with those of New York.

The Ant-birds (*Formicariinæ*) of South America do not appear to restrict themselves specially to a diet of ants, although undoubtedly insectivorous. In general habits they seem to approach the Babblers of the Old World, as well as in form, but may be distinguished by the separate scaling of the back of the shank, the Babblers having this covered by a continuous plate in the usual way. They build open nests, and are even less melodious than the Babblers; their beak is usually stouter and more hooked than in those birds, and their plumage commonly barred across with light and dark.



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Brazilian Bush-shrike (*Batara cinerea*). (*See p.* 97.)

This is a male : its plumage is black, white, and grey ; the female is barred with buff, and has a chestnut cap.

[*To face p.* 96.

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Red Bird of Paradise
(*Uranornis rubra*).

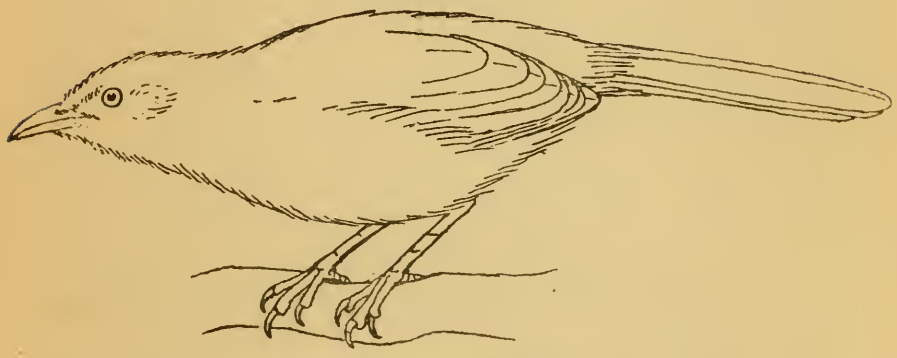
It is only the side-plumes that are red in this species, the body-plumage being brown and yellow, with green about the head.

Twelve-wired Bird of Paradise
(*Seleucides alba*). (*See p.* 98.)

This species is about as big as a Jackdaw, with plushy plumage of deep metallic green and purple, and pale yellow side-plumes.

They are not a well-known group, but some species attract attention by their barred plumage, like that figured, the largest of the group (*Batara cinerea*).

Babblers (*Crateropodinæ*) are widely spread over the warm parts of the Old World. Except for their soft loose plumage, short wings, and coarser bill and feet, they much resemble the Thrushes and Warblers, but differ much in some habits, especially in frequently using one foot to hold food, and in being exceedingly sociable and affectionate, and often very noisy. The



Outline of Babbler.

most familiar to European eyes is the pretty little cage-bird from China and the Himalayas commonly sold as the Pekin Robin or Japanese Nightingale (*Liothrix luteus*); but it appears probable that the Bearded Reedling (*Panurus biarmicus*), a European and even British bird, is really an outlying member of this family, as is also the Wren-tit (*Chamæa fasciata*) of California. It is agreed that neither of these birds really are Tits. Babblers usually build open nests, and often lay unspotted blue eggs, like our Hedge-Sparrow (*Accentor modularis*), which may perhaps properly be classed here, though usually placed among the Thrushes.

The only three-toed Passerine bird (*Cholornis*

paradoxa), in which the outer front-toe is missing, is a Babbler.

The best-known species, owing to its popularity as a cage-bird, is the above-mentioned *Liothrix;* it is about as large as a Sparrow, olive-green above and pale yellow below, with orange on the breast and wings. It is exceptional among Babblers in having a forked tail; it has bred in captivity. The "Seven Sisters" (*Crateropus canorus*) are familiar birds in India. This species is rather larger than a Thrush, with dusty-drab plumage, and white eyes, bill and feet. Another common Eastern Babbler is the Rat-bird (*Argya caudata*), coloured like a Lark, and not much larger, with a long Magpie-like tail. The large Grey Babbler (*A. malcolmi*) is less widely distributed; it is as big as a Dove, pale grey, with yellow eyes and white outer tail-feathers. The little White-eyes or Blight-birds (*Zosterops*), much like Willow-wrens, with a white ring round the eyes, extending from Africa eastwards to Japan and New Zealand, apparently belong to this group.

Birds of Paradise (*Paradiseinæ*) are really gaudily-dressed Crows, since in general size, form and habits they much resemble Jays; the feathering at the base of the bill, however, is velvety instead of bristly, and the body-plumage in the males is often wonderfully gorgeous in colour and elaborate in form, long plumes or tufts of plumes, which are purely ornamental, being frequent, especially on the head or flanks. The body plumage in many species is much like velvet in appearance and texture, or brilliantly metallic. These birds, which inhabit New Guinea and the adjacent countries, build simple open nests, and have loud powerful voices. They go through elaborate courting displays, the males showing off their special adornments. When young the sexes are alike.

Several species are not only well-known as skins,

but have been kept in captivity, which they bear remarkably well. The best known and largest is the Great Emerald Bird of Paradise (*Paradisea apoda*), of the size of a Rook, chocolate with yellow head and green throat, and long orange-yellow flank-plumes. The hen has no decorative colours, being simply a brown bird. Its note is a loud bawling "wawk-wawk." The King Bird of Paradise (*Cicinnurus regius*) is of the size of a Thrush, velvety-scarlet above and white below, with tail short—short for the most part, but provided with two long wire-like feathers with curled green tips. He has very short drab side-plumes tipped with green. The hen is brown above and dun closely barred with black below. This is the most abundant and widely-spread species, and, as it does not keep so high in the trees, the oftenest seen. Both of these, as well as the Red and Twelve-wired species, have been exhibited at the Zoo.

Bower-birds (*Ptilonorhynchinæ*), inhabiting the Australian region, are closely allied to the Birds of Paradise, and much resemble large Thrushes in general form, but usually have a stouter bill, often closely feathered at the base. Their plumage is seldom gorgeous, but they are interesting for the remarkable "bowers" or playing-places which they build and decorate with various objects. The real nest is an ordinary cup-shaped structure. These birds feed chiefly on fruit, and the main interest in their habits lies in the bower-building instinct, whereby in this particular respect they are raised nearer to man than any other animals, since no other creature builds a house and decorates its precincts merely for social amusement.

The bower varies much in construction according to the species. The best-known, the Satin-Bird (*Ptilonorhynchus holosericeus*), makes an avenue of twigs about which it strews feathers, bones, shells,

bright pebbles, etc. This bird is of the size of a Jackdaw, deep satiny-blue in the adult male, dull green above and mottled below in the female. It does well in captivity, and may generally be seen at the Zoo. The Regent-Bird (*Sericulus mellinus*), about the size of a Dove, intense black and golden yellow in the male, and brown above and mottled below in the female, merely covers a cleared space with leaves. This has been bred in captivity in England by Mr. R. Phillipps.

The Gardener-Bird (*Amblyornis subalaris*), brown with a huge orange crest in the male, has not been imported alive; it builds a hut round the base of a small tree, and makes a meadow of moss in front, strewn with flowers, buds, etc. It is found in New Guinea.

Broadbills (*Eurylaeminæ*) are a small but very distinct group of tree-haunting birds inhabiting South-east Asia and the East Indian Islands. They are thick-set in form, with short wings and legs, and short, but usually large and broad beaks. The two outer front toes are united at the base. The plumage, which is usually brilliant with a peculiar gloss, differs little according to age or sex. The nest is a covered hanging structure, with a sort of tail below, and the eggs are usually spotted. These birds feed on insects or fruit; none have ever, so far as I know, been brought to Europe alive. Two species are fairly familiar as stuffed-birds, *Eurylaemus javanicus*, black and yellow above and puce-colour on the head and below, and *Cymborhynchus macrorhynchus*, black above and crimson below, with a blue bill.

Bulbuls (*Pycnonotinæ*) are very characteristic of the warm parts of Asia and Africa. They have bills of medium size and tails of considerable length, and are often crested; they are usually brown or olive-green in colour, frequently there is a patch of red or yellow under the tail, and these feathers are puffed out when the bird is excited. They are mainly fruit-

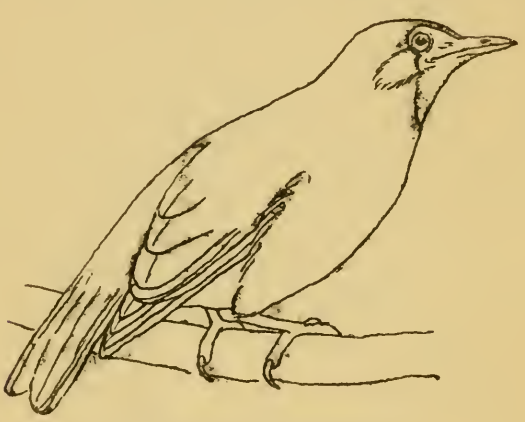
eaters, and build open nests in bushes; their eggs are often pink with red spots. Sometimes classed with the Babblers, they are certainly nearly related to them through some more or less intermediate forms, but in general habits they are very different, since they fly about much more and do not keep so much to cover.

Outline of Bulbul.

The Red-eared Bulbuls (*Otocompsa emeria* and *jocosa*) are widely-spread in India and Burma. They are brown above and white below, with a long black crest and red patches on the cheeks and under the tail. The Red-vented Bulbuls (*Molpastes hæmorrhous* and allies) are locally commoner; they are dark in plumage, with black heads, and crimson under the tail. The common African species have this patch yellow.

The Green Bulbuls (*Chloropsis*) are bright leaf-green, and have long tongues with which they sip honey; the best known is the Gold-fronted (*C. aurifrons*). Bulbuls do well in captivity, and a few species have bred, including the Palestine Bulbul (*Pycnonotus xanthopygus*), which has a fine song, somewhat like that of the Nightingale The name Bulbul, by the way, properly indicates this bird or one of its Eastern representatives.

Chatterers (*Cotinginæ*) form a group confined to America, and almost entirely to its southern portion.



Outline of Bell-Bird.

Their bill varies in form, but has a wide gape and is often small, although at times somewhat crow-like; their shanks are usually covered with numerous small scales behind. This group includes many very brilliant and many equally curious forms, such as the Cocks-of-the-Rock (*Rupicola*), orange or red birds as large as Pigeons; the black Umbrella-Birds (*Cephalopterus*), and the Bell-Birds (*Chasmorhynchus*). Some of these are large for Passerine birds, the Common Umbrella-Bird equalling a Crow. Their nesting-habits vary, but their ways of life as a whole are little known. Their food consists of fruit, with insects and other small

animals. A familiar species is the Naked-throated Bell-Bird (*Chasmorhynchus nudicollis*), of the size of a Dove, white, with bare green face in the male, olive-green in the female, with a remarkable metallic note; it is usually on view in the Zoological Gardens, where the common Cock-of-the-Rock (*Rupicola crocea*) has also been exhibited.

Creepers (*Certhiinæ*) are small birds ranging over most of the world except South America. Their bill is slender, and may be straight or curved; the outer front toe is nearly as long as the middle one. They are insect-eating climbers, place their nests in crevices, and are usually brown in colour, like our familiar Tree-creeper (*Certhia familiaris*), which is found all round the Northern Hemisphere. The grey Wall-creeper (*Tichodroma muraria*), with rose-coloured marking on the wings, is, however, an Old World species of Alpine haunts. Both have been kept in captivity.

Crows (*Corvinæ*) are large birds for the Passerine family, the biggest—Ravens—equalling a good-sized fowl, and the smallest a Thrush. They have strong and usually stout bills, with the nostrils generally concealed by forwardly directed bristles. Their feet are strong, and are used to hold down food while they eat. Birds of this group are notably omnivorous, and are usually social. There is no sex-difference or seasonal change throughout the group. The nests are generally open, and the eggs spotted. Many walk when on the ground, and the flight has not the undulating character usual among Passerine birds. One type or other of the group is found everywhere, but the Magpies and Jays are absent from Australia, and the typical Crows from South America.

These typical forms are always at least as big as Pigeons, with long wings and moderate tails; their plumage is generally black, as in the Carrion Crow (*Corvus corone*) of the Old World, the American Crow

(*C. americanus*) and the Raven (*C. corax*) of both hemispheres. The Crow of Australia (*C. australis*) is also all black, but with white eyes. The common species of Africa (*C. scapulatus*) has a broad white collar, and the Indian House-crow (*C. splendens*) a grey neck. This last is a very glossy species, and of rather small size, like the Jackdaw of Europe and North Asia (*C. monedula*), which has also a grey neck, but a short beak and white eyes. The Hooded Crow (*C. cornix*), widely spread in the Old World, has the head, wings and tail alone black, the body grey. Rooks (*Trypanocorax*) have the face bare.

Of the Magpies, with long graduated tail and short wings, our common species (*Pica pica*) ranges all round the Northern Hemisphere; the Common Indian Pie (*Dendrocitta rufa*) belongs to a more arboreal group and is cinnamon, with smoky-grey head and silver-grey and black wings and tail. The Blue Pies (*Urocissa*) are mountain-haunting Asiatic species, with very long tails, blue plumage and red bills.

The Jays comprise species with short wings and medium tail, our own well-known Jay (*Garrulus glandarius*) ranging to Persia, and replaced by very similar forms as far as Japan. The North American Blue-jay (*Cyanocorax cristatus*) is a much more familiar bird than our species is here; and the Whisky-jack (*Perisoreus canadensis*), a plain grey bird, about as big as a blackbird, is well known in Canada.

Drongos (*Dicrurinæ*) are much like the typical stout-billed Shrikes, but differ in their forked tails, plumage generally glossy black throughout (rarely grey) and in only having ten tail-feathers, whereas twelve is the usual number in Passerine birds. They watch for insect food from a perch, seldom hopping about. They are found almost throughout warm regions in the Old World, and make themselves conspicuous by their attacks on other birds, often in defence of their open

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American Blue Jay (*Cyanocitta cristata*). (*See p.* 104.)

The Blue Jay is smaller than our bird, and of some shade or other of blue all over, varied with black and white.

[*To face p.* 104.

Photos copyright by the Oxford Museum.

Green Tody (*Todus viridis*).
(*See p.* 164.)

The coloration of this species is very simple—green, with red throat and white breast; it is of the size of a wren.

Parson-bird (*Prosthemadera novæ-zealandiæ*).
(*See p.* 108.)

The Parson bird derives its name from its dark glossy plumage and white neck-tufts, compared to clerical bands.

nests high up in a tree. The best known is the King Crow of India and eastwards (*Dicrurus ater*), represented by a very similar race in Africa. It is about as large as a Starling, and commonly seen perched on telegraph-wires or the backs of animals. The Bhimraj, or Racket-tailed Drongo (*Dissemurus paradiseus*), remarkable for its crest, long racket-tipped outer tail-feathers and powers of mimicry, is the only one well-known in captivity.

Dwarf Pittas (*Xenicinæ*) are tiny short-tailed birds, only found in New Zealand and Stephens Island. They are much smaller and duller than the true Pittas (which are as large as Thrushes), and are often locally called Wrens. The Dwarf Pittas build in holes.

Finches (*Fringillinæ*) are found all over the world, except in Australasia, where the so-called Finches really belong to the Weaver group, supposing this to be distinct. They are, however, pre-eminently Northern birds, and many are migratory. They never exceed a Thrush in size, and are generally much smaller; their bill is short and conical, and the mouth turned down at the corners. The wings are often long, but the tail usually moderate and slightly forked. The young are usually streaked in this group, and the males often show a seasonal change. Their eggs are usually spotted, and the nest open; their food is chiefly vegetable, especially consisting of seeds, which they husk before swallowing them. They have long been well-known cage-birds, being often good singers, and the Canary (*Serinus canaria*) of the Atlantic islands is one of the best known domestic birds. Its natural colour is streaky olive-green, and it is hardly more than a local race of the Continental Serin (*S. hortulanus*). The "Wild Canary" of North America is the North American "Goldfinch," really one of the Siskins (*Chrysomitris tristis*). The male is yellow, with black cap, wings and tail; the female, olive-green. The

true Goldfinch of Europe (*Carduelis carduelis*), so favourite a cage-bird, is locally established in North America, by introduction, and by the same means has now fortunately become very common in New Zealand, Tasmania and South Australia. Its red face and yellow-and-black wings are common to both sexes. In California, one of the Rose-finch group (*Carpodacus frontalis*), brown with crimson head, is a familiar bird, building about houses, but, of course, the dominant house-finch in most places is the too familiar House-Sparrow (*Passer domesticus*), with a wide natural range across Europe and Asia, and, unfortunately, introduced into North America and the Australian region. The various native "Sparrows" of America are rather of the Bunting type.

The Red Cardinal (*Cardinalis cardinalis*), ranging, with various allied forms, from Kentucky to Brazil, deserves mention, as it is well known as the "Virginian Nightingale"; it is nearly as big as a Thrush, crested, the male red and female light brown. It has bred in captivity in England. Another beautiful North American finch is the Nonpareil (*Cyanospiza ciris*), of the size of a Linnet, the male with rich blue head, red breast and green back, the female green above and yellow below.

The typical Buntings, like our Yellowhammer (*Emberiza citrinella*), have a very characteristic beak, with the centre of the palate ridged; but they grade into the typical finches. The Snow-Bunting (*Plectrophanes nivalis*), found all round the world in the Arctic regions, is the most northerly Passerine bird, though a race of Redpoll (*Acanthis hornemanni*) breeds in Greenland.

The Crossbills (*Loxia*), whose characteristic crossed-tipped bill distinguishes them, are found in both hemispheres, chiefly in northern and mountainous regions.

Flower-peckers (*Dicaeinæ*), found in the warm parts

of the Old World, are exceedingly tiny birds with short beaks. They build hanging nests as a rule.

Some of these birds have quite short thick beaks, but their very small size—as a group they are the smallest birds in the Old World—distinguishes them easily as a rule.

Few are well known, but two species, the plain drab *Dicaeum erythrorhynchus*, the smallest bird in the Old World, and the almost equally small Crimson-backed Flower-pecker (*D. cruentatum*), have been exhibited at the London Zoological Gardens. The Australian Diamond-Bird (*Pardalotus punctatus*), beautifully spotted with white, is assigned to this group.

Flycatchers (*Muscicapinæ*) are small birds with, usually, small feet, and bills of moderate length, provided with bristles at the root; they usually sit quietly on some favourite perch, making short sallies after insects at intervals. Some have longer legs and move about more on their feet, and the group merges imperceptibly into the Robins. They usually build open nests, and the first plumage of the young is buff-spotted as a rule. Our familiar Spotted Flycatcher (*Muscicapa grisola*) is a good example. The group is most numerous in warm climates, and is confined to the Old World, the "Flycatchers" of America belonging to the Tyrant group. Some Flycatchers are richly and conspicuously coloured; for instance, the Verditer Flycatcher (*Stoparola melanops*) of India, which is pale blue; and the Niltava (*Niltava sundara*), dark rich blue above and orange below, the female being brown. This bird has been kept alive in Europe, but, speaking generally, Flycatchers are seldom seen in captivity. The Paradise Flycatchers (*Terpsiphone*), in which the males are usually white, with very long tails, and the females brown, both with black heads, are conspicuous birds in the East. The Fantail Flycatchers (*Rhipidura*), which hop about

much, constantly spreading their tails, are also familiar birds from India eastwards, ranging all through the Australian region; two are familiar birds in New Zealand.

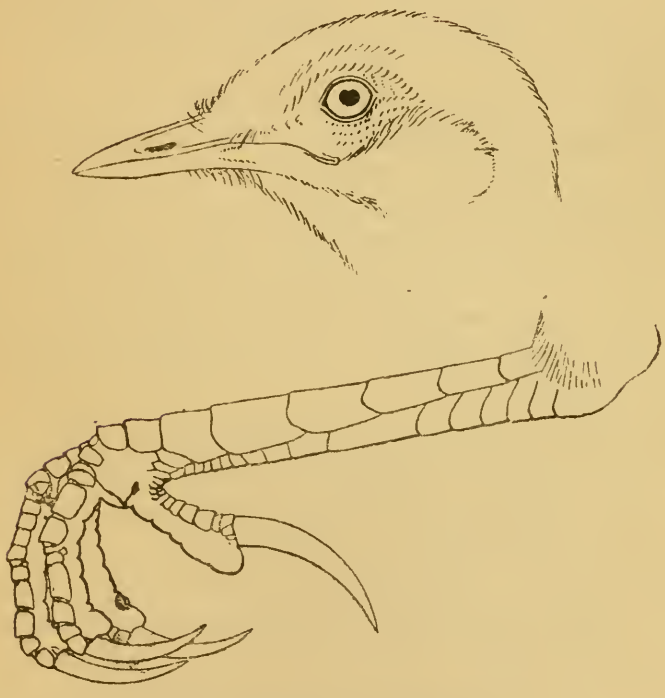
Greenlets (*Vireoninæ*) are small American tree-haunting insectivorous birds. Their plumage is green or olive, and their bills vary from slight to stout; they build open nests, and are sometimes classed with the Shrikes, which group the strong-billed types somewhat resemble in appearance. The slender-billed ones, however, such as the familiar Red-eyed Vireo (*Vireo erythropthalmus*), which has been exhibited in the London Zoological Gardens, much resemble Willow-Warblers in appearance and actions.

The Honey-eaters (*Meliphaginæ*) of the Australian region are usually birds of fair size, though this varies; their plumage is generally dull, and their bill slight and inclined to be long and curved, although usually shorter and stouter than in the Sun-birds. Their nests are generally open ones of ordinary form. They are very characteristic birds of Australia, and the large species of "Wattle-birds" (*Acanthochæra*), with white-streaked brown plumage and as big as Doves, are shot and eaten. The Tui, or Parson-bird, of New Zealand (*Prosthematodera novæzealandiæ*) is also a familiar bird, and has been frequently kept in captivity in Europe. It is a good mocker, and will learn to talk.

Larks (*Alaudinæ*) are found nearly everywhere, and are the most terrestrial of Passerine birds. Their shanks have separate scales up the back as well as the front, which will distinguish them from other families of similar habit. They dust themselves instead of washing, build on the ground, seldom perch in the day and never at night. Their plumage is brown more or less streaked, and the young are spotted with buff. The bill varies, as does the claw of the hind-toe, which is most commonly long and straight. The sexes are usually alike.

Our Skylark (*Alauda arvensis*) ranges all across the northern parts of the Old World, and is represented in Southern Asia by resident races such as the Indian *A. gulgula*. It has also been introduced into New Zealand and Hawaii. The only true Larks in America are the Horned or Shore-larks (*Otocorys*), which are also widely spread in the Old World.

Lyre-Birds (*Menurinæ*) are large pheasant-like



Head and foot of Lyre-Bird.

creatures with very strong feet and nearly straight claws; they are the biggest of Passerine birds except some of the larger Crows, and inhabit Australia. The males have long peculiar tails, resembling in the common species an ancient lyre. Appropriately enough they are fine singers and mockers. Specimens have

been exhibited in the London Zoological Gardens. Lyre-birds are remarkable among the Passerine family in having downy young, the down being uniformly coloured; but the young are not active.

Mamos (*Drepanidinæ*) are confined to the Sandwich Islands, and therefore not likely to be mistaken for other birds; they resemble Sun-birds or Finches (which are not native to those islands), having either slender or stout bills, often in the former case much curved. Their tints are red, yellow, or green, not metallic, and they have a peculiar smell, like that of the Petrels.

Manakins (*Piprinæ*) are not to be confused with the "Mannikins" of bird-dealers, which, as mentioned on p. 125, are small Weaver-Finches. The present group includes small fruit-eating New World birds, mainly confined to South America, and haunting forests and bush. They have small beaks but wide gapes, the two outer front toes joined for half their length, and are very often gorgeously coloured. Their shanks are separately scaled behind.

Nuthatches (*Sittinæ*) are small species of about a Sparrow's size, have straight and generally rather strong bills of moderate length, short tails, and large feet with the inner front toe noticeably short; their prevailing colour is blue-grey, or even blue. They are partly vegetable-feeders, although living much on insects, and, unlike any other climbing birds, can climb downwards as well as up. Their nest is placed in a hole. They are sometimes placed in the same family as the Creepers, and, like them, inhabit most of the world except South America; they are not much addicted to migration. Our familiar species (*Sitta caesia*) is a good type of the group; the common American bird (*S. carolinensis*), however, differs strikingly in its black cap and white face. In Nuthatchers the sexes are generally alike, nor do the

young differ noticeably. The typical species are easy birds to keep in confinement.

Orioles (*Oriolinæ*) are birds with strong bills of medium length, and short legs. They are commonly coloured richly with yellow, red, or olive-green combined with black, and are rather large, equalling or exceeding a Thrush. They inhabit most of the Old World—the so-called Orioles of America being members of the Troupial family (p. 120)—and build beautiful hammock-like nests slung in the forks of branches; they keep very much to the trees, hardly ever coming to the ground, and feeding on fruit and insects. The common Indian (*Oriolus melanocephalus*) and African species (*O. larvatus*) have black heads, whereas that of Europe (*O. galbula*) and its near relative in the East (*O. kundoo*) have the head yellow, though there is black on the wings and tail as in the first two. Orioles are not much kept in captivity, being rather difficult subjects.

Pittas (*Pittinæ*), which are widely diffused through the warm regions of the Old World, have rather strong bills, short tails and wings, and the back of the shanks with a smooth uniform covering. The latter point and their very gay colouring will in most cases distinguish them from some short-tailed Ant-Birds (*Formicariidæ*). They are insectivorous, and build domed nests. They are often called Ant-Thrushes, but, unlike most of the families with smooth hinder shanks, differ anatomically from the thrushes, and do not seem to feed especially on ants. They live chiefly on the ground, though often perching, and hop rapidly, not running like most ground-birds. Being haunters of forests, they are not well known as a rule; the most familiar being the Bengal Pitta, or "Nowrung" (nine colours) (*Pitta brachyura*), green above, with head streaked drab and black, and patches of brilliant sky-blue on the wings and at base of tail. Below it is buff

with a scarlet patch on the abdomen. This and one or two others have been kept in captivity in England and elsewhere.

The Plant-cutters (*Phytotominæ*) of South America are vegetable-feeding birds much resembling Finches, but with the edges of the bill toothed and the back of the shank separately scaled with many small scales. They are very destructive to vegetation, and build open

Outline of Pitta.

nests in bushes. The males are reddish in colour and the females greyish.

Scrub-birds (*Atrichiinæ*) are small Australian birds, with rather long tails and very short wings; their shanks have separate scales on the back, by which they are separated from any other Passerine birds of similar shape found in Australia. There are only two species, brown in colour, and of insectivorous habits, haunting thick cover and seldom flying.

Shrikes (*Laniinæ*), found almost everywhere except in South America, are strong-billed, large-headed insect-eaters, with, in typical cases, a decidedly hawk-like beak. They are usually sedentary like the Flycatchers, but take larger prey, being bigger birds as a rule; often they feed on other birds, or on small reptiles and mice, &c. The first plumage of the young is barred. The nest is open and placed in a bush or tree.

The type, however, is not constant in this family; some Shrikes, chiefly African, have the very short wings, strong feet, and general habits of Babblers, from most of which their strong bills separate them; others, as the familiar "Australian Magpies" (*Gymnorhina*), look and behave much like Crows, but differ by their exposed nostrils. The last-named are very familiar birds in Australia, and are frequently exported; they have bred in England in one instance. Among the Babbler-like forms the yellow-throated green Bacbakiri of South Africa (*Laniarius bacbakiri*) is a familiar bird.

The so-called Cuckoo-Shrikes are mostly weak footed, tree-haunting forms, coloured much like some Cuckoos, grey above and barred below; but to the same group belong the delicate and brilliant insect-eating Minivets, the males of which are usually bright red-and-black, and the females yellow-and-grey; they have long tails, and go in flocks. The best known is the Indian Rajah Lal, *Pericrocotus brevirostris*.

Starlings, or Mynahs (*Sturninæ*), found almost all over the Old World, have usually bills of an elongate-conical shape, with the mouth noticeably turned down at the corners, strong feet and short tails. The plumage of the adults is usually glossy. They build in holes in trees, etc., as a rule, but many usually feed on the ground, where they run instead of hopping; they are omnivorous. They fly with a steady, even flight, unlike the bounding action of most small Passerine birds.

There are many Tree-Starlings which seldom come to the ground, and hop when they are there (such as the Hill-Mynahs (*Eulabes*) of the East), but the glossy plumage of these will distinguish them from most birds with which they might be confounded.

Besides the glossy, cream-spotted European Starling (*Sturnus vulgaris*), widely spread in the Old World naturally, and now established by importation in New Zealand, Tasmania, South Australia and the United States, the House-Mynah of India (*Acridotheres tristis*) is a very familiar bird, ranging widely in the East, where it especially affects human habitations, and having been introduced into Australia, New Zealand, Hawaii, and many tropical islands, such as Mauritius. It is larger than a Thrush, brown, with black head, yellow bill and feet, and wings and tail marked with white. Like the European Starling, it will learn to talk; but the true talking Mynahs (*Eulabes*) are very different birds, glossy black and heavy in form, with yellow head-wattles; they are tree-haunting fruit-eaters, living in forests, not near habitations. The Ox-peckers (*Buphaga*), brown African birds with red or yellow bills, which creep over animals, feeding on their parasites, are placed with the Starlings.

Sugar-birds (*Cœrebinæ*) of the West Indies and South America are small slender-billed species, often very brightly coloured, with apparently much the same habits as the Sun-birds and Flower-peckers of the Old World; they also build domed nests.

Few are well known, but the Yellow-winged Sugar-bird (*Cœreba cyanea*) is too familiar from the use of its skin for decoration, and has been kept caged successfully in England; it is about the size of a small Tit, the male purple, with metallic sea-green crown, concealed yellow in the wings, and red feet. The female is dull green. The Purple Sugar-bird (*C. cœrulea*) is almost all purple, with yellow feet.

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Rosy Pastor (*Pastor roseus*). (*See p.* 113.)

In the transition stage between the brown young plumage and adult coloration, which is pied salmon-pink and glossy black. This, although a starling, shows a tendency to resemble a thrush in some points.

[*To face p.* 114.

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New Zealand Robin (*Miro australis*). (*See p.* 118.)

This species inhabits the South Island; the North Island bird, now rare, has not the white breast.

Sun-birds (*Nectariniinæ*), ranging through Africa and Southern Asia to Australia, are for the most part small but very beautiful birds, the males with highly glossy metallic plumage, and with slender, usually curved bills, haunting flowers for food, which consists of honey and insects. Their bills are minutely serrated along the edge, though a hand-lens is needed to see this properly. They are often confused with the Humming-birds of America, but these have very short legs and feed on the wing, while the Sun-birds have legs of ordinary length and hop. They used to be confused with the Creepers, but have not their shape of foot. The nest is usually hanging and roofed, with an entrance-hole at the side.

These are often familiar garden birds; two Indian species are very well known in this way; the Purple (*Arachnecthra asiatica*), dark metallic purple, with flame-coloured tufts in the armpits, and the Amethyst-rumped (*A. zeylonica*), purple, green and crimson above and yellow below. The females of both are dull green, and the male of the former assumes this colour after the breeding season. He sings well. Both these species, which are about as big as Wrens, have been kept alive in England, and so has the African Malachite Sun-bird (*Nectarinia famosa*), as big as a Linnet, glittering green, with long centre tail-feathers.

Swallows (*Hirundininæ*) are spread nearly all over the world, but none permanently inhabit New Zealand, though stragglers from Australia have occurred there. Their exceedingly small bills and feet and remarkable length of wing prevent confusion with any other Passerine birds. They are often confounded with the non-Passerine Swifts (*Cypselidæ*), which are similar in form and habit, but the large hind-toe and coarsely-scaled shank of the Swallow, with its twelve tail-feathers against the Swift's ten, will differentiate them; moreover, Swallows often perch, while

Swifts seldom do so. Their nesting-habits vary a good deal, but the nest is either a mud-built structure or placed in a hole, generally speaking. They walk, or rather waddle, when on the ground, instead of hopping.

The House-Martins (*Chelidon*) differ from the rest of the group and all other Passerine birds by having the feet partly covered with white down instead of scales, but these appear on the centre of the shanks. Our House-Swallow (*Hirundo rustica*) is found, according to season, over most of the Old World, and in America is replaced by the Barn-Swallow (*H. horreorum*), which is very similar, but has all the underparts chestnut. The House-Martins are purely Old-World birds, but the Sand-Martin (*Cotile riparia*) extends all round the world. The American Purple Martin (*Procne purpurea*) is very different from our Martins; it is a larger bird, as big as a Lark, glossy purple in the male, the female being duller and white below; it often builds in boxes put up for it, as does the White-bellied Swallow (*Tachycineta bicolor*), very like our House-Martin, but with bare feet and no white patch on the back. In India and Africa the Wire-tailed Swallow (*Hirundo smithii*), blue-black above and white below, with chestnut cap and very long outer tail-feathers, is a well-known bird locally.

Tanagers (*Tanagrinæ*) are American, and chiefly confined to the southern half of the New World. Their bills are more or less conical in form, and exhibit the nostrils exposed, but they vary in thickness of beak, some species being almost indistinguishable from thick-billed Finches, and others so slender in bill that they grade into the American Warblers (*Mniotiltidæ*). These birds are chiefly fruit-eaters, build open nests, and are often exceedingly brilliant and beautiful in colour, the females being often almost equally so with the males. Such is the case with the Brazilian Superb Tanager (*Calliste fastuosa*), well known in captivity in

England, which has the head metallic sea-green, underparts purple, and lower back flame-colour. The Scarlet Tanager (*Rhamphocoelus brasilius*), also South American, is as large as a Lark, velvety-scarlet with black wings and tail in the male, brown in the female; it is also often imported and has laid and partly reared young in England. The Maroon Tanager (*R. jacapa*), much darker red in the male, is a well-known and common bird in South America, as also is the Blue (*Tanagra episcopus*), pale lavender and blue in both sexes. The migratory North American *Pyranga rubra* and *P. erythromelas* are well known as "Summer Red-birds"; their females are olive-green, and the males assume this colour after breeding, for a time.

Tapaculos (*Pteroptochinæ*) inhabit South America; they have very strong coarse feet, much like the Lyre-Bird's on a small scale, and fairly stout and short beaks, with the nostrils overhung by a scale on the inner side. Their tails are rather short, and they are great skulkers, but very noisy. Their shanks have several scales up the back. This distinguishes them from the larger Wrens, to which they bear some resemblance in form and habits. Their plumage is dull.

Thrushes (*Turdinæ*) are a very numerous and widely-spread group, found almost everywhere; many are highly migratory; they present no remarkable peculiarity of form, the bill being slight and of medium length, as are also, as a rule, the wings, tail and legs. The head is never crested, nor is the plumage glossy. The eggs vary much; the young are usually spotted with buff. The typical species, to which the name Thrush or Ouzel is generally restricted in popular language, are birds of fair size for this family; the smaller kinds are grouped as Robins, Redstarts and Chats. The larger forms have the widest distribution, none of the Redstarts, for instance, occurring outside the Old World, while only one Chat, the familiar Wheatear

(*Saxicola œnanthe*), the most widely distributed of all, extends to America, being found both in Greenland and Alaska.

Our well-known Song-Thrush (*Turdus musicus*) and Blackbird (*Merula merula*) range as far as Persia, and the latter to Kashmir; they are now established in New Zealand. The Missel-Thrush (*Turdus viscivorus*) extends along the Himalayas. The self-coloured Thrushes, or Ouzels, allied to the Blackbird, have a wider range than the spotted ones, some being found even in the Pacific Islands. The best-known North American Thrush is the "American Robin" (*Turdus migratorius*), of the size of our Blackbird, drab above, with black cap and tail, and cinnamon-red below. It lays blue eggs, and is a familiar garden bird. The Sabia (*Turdus fumigatus*) is the most famous songster in Brazil; it is a light brown Thrush about the size of our Song-thrush.

The Nightingale belongs to the Robin group; our common species (*Erithacus luscinia*) is replaced in Eastern Europe by the Sprosser (*E. philomela*), and in Persia by the true Bulbul of poetry (*E. golzii*); but all three are much alike in appearance.

Our Robin (*E. rubecula*) ranges east to Persia. The common Robin of India and Burma is the Dhyal (*Copsychus saularis*), pied black-and-white in the male, grey-and-white in the female; at the Cape the Jan-frédric (*Cossypha cafra*), grey above, with white eyebrows, and tail, as well as breast, rusty red, takes its name and place.

In North America the Blue-bird (*Sialia sialis*) is the most Robin-like species, sky-blue above and bay below in the male, duller in the female; it is rather larger and longer-winged than our Robin, but has similar tame habits, though less of a ground-feeder.

The Dippers (*Cinclus*) are aquatic Thrushes, with short tails and dark plumage, sometimes relieved by

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American Cat-bird (*Galeoscoptes carolinensis*). (*See p.* 119.)

The Cat-bird is about the size of a Lark, but much resembles our Blackcap Warbler (*Sylvia atricapilla*) in colour and shape.

[*To face p.* 118.

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Kiskadee *or* **Sulphury Tyrant** (*Pitangus sulphuratus*). (*See p.* 122.)

The Sulphury Tyrant is about as big as a Thrush, brown in colour, with black-and-white head and yellow breast.

white ; they are found in hilly regions in both Old and New Worlds, but not in Africa excepting in the Atlas range, nor in the Australian region.

The Mocking-birds are a purely American section of this group, notable for their long tails. The typical Mocking-bird (*Mimus polyglottus*) of North America is grey, with the wings and tail marked with white. It is chiefly a bird of the Southern States, and there are several very similar species in South America. The Brown Thrasher (*Harporhynchus rufus*) is very like our Song-thrush, except for the long tail, pale eyes, and more decided tints. The Cat-bird (*Galeoscoptes carolinensis*), so-called from its mewing note, is a much smaller species.

Tits (*Parinæ*) are small species, with short wings, strong small feet and bills, and fluffy plumage, showing usually but little difference between the sexes or between adults and young ; they are tree-haunting birds, found almost everywhere except in South America, and chiefly insectivorous, though many eat much vegetable food also. The nest is usually in a hole or domed.

Although less migratory than almost any other Passerine group, the Tits inhabit a great range of climates, species of the same typical genus (*Parus*) as our common Blue and Great Tits (*P. major* and *P. cæruleus*) being found in Africa and New Guinea. They are often very gaily-coloured birds, but the American species are all dull in tint. The above-mentioned Blue and Great Tits do not go further east than Persia ; the former, however, has a close ally in the Indian Grey Tit (*P. cinereus*), which resembles our Great Tit, except in lacking the yellow tints in the plumage, and ranges from Turkestan through India to China, while a similar species with a green back (*P. minor*) extends to Japan. A well-known Japanese species is the Red-sided Tit (*P. varius*), of the size of our Great Tit, and conspicuous for its chestnut flanks and cream-and-black head, a common cage-bird in

that country, and often imported to Europe, though as a rule Tits do not do well in captivity and are seldom kept anywhere. The most familiar Tit in North America is the Chickdalee (*Parus atricapillus*), which is a very much enlarged edition of our Marsh Tit.

The little long-tailed Tits, typified by our species (*Acredula caudata*), are more purely insectivorous and less familiar birds; but the Red-crowned Tit (*A. ioschistus*) is a familiar bird in parts of the Himalayas; it has a shorter tail than our bird, and is grey above, with chestnut cap.

Troupials, or Hang-Nests (*Icterinæ*), are an exclusively American sub-family, but they are much better represented than the Tanagers in the northern half of the continent, where some species are among the most familiar birds, often called, from their dark or yellow-pied plumage, "Blackbirds," or "Orioles," although they are by no means nearly related to those birds. Some are as big as crows, and they are usually larger than sparrows; their beak is noticeably conical, but varies much in length and thickness, some having it as stout as a sparrow's, like the "Bobolink" (*Dolichonyx oryzivorus*), and others as thin as a starling's, such as the Meadow-Lark (*Sturnella ludoviciana*). The beak has a marked tendency to run up on the forehead, and the feet are strong, like a Starling's, which these birds much resemble in many ways; but they use the foot to hold down food, unlike those birds. They are social, but spiteful in disposition. The food is both vegetable and animal, and the nest varies. In America these birds seem to represent the Starlings and Weavers of the Old World, and perhaps unite those groups.

The Bobolink, which is about as large as a lark, and coloured much like one in the female sex, and in the case of the male out of the breeding season, is black-and-white in nuptial dress; but no other species exhibits such a change. This is a very familiar bird in

North America, and a valued songster in the north; on its southward migration, however, it is a pest in the rice fields, and is eaten as a delicacy under the name of "Rice-Bird." The Red-winged Blackbird (*Agelæus phœniceus*) is about as large as a thrush, black in the male, with scarlet patches on the pinions; the female lark-coloured. This is a useful insect-destroyer, but also destructive to grain. The Meadow-Lark is a terrestrial short-tailed species, of the size of a thrush, lark-coloured above and yellow below. It is a most useful bird, but does not equal the true Larks in song. Some very similar South American species, with scarlet underparts, are locally known as "Robins."

The "Golden Robin" of the United States is also a bird of this family, the Baltimore Oriole (*Icterus baltimore*), of the size of a lark, pied black and rich orange in the male, more olive in the female; like all the genus *Icterus* and allied forms, it is arboreal. A South American *Icterus*, the Brazilian Troupial (*Icterus vulgaris*), is one of the most commonly imported of this family, though all are easily kept. It is as big as our Blackbird, pied black and orange, with bare grey eye-patch and a white patch on the wing. These species build hanging nests, much like those of Weavers, but with the entrance at the top.

The Cow-Birds (*Molobrus*) are finch-billed, ground-feeding birds of this family, about the size of Starlings, parasitic in habits like some Cuckoos. The familiar North American species (*M. pecoris*) is black in the male, with a brown head, brown in the female; but the South American Glossy Cow-bird (*M. bonariensis*), glossy purple in the male and sooty brown in the female, is the best known in England, being more frequently imported as a cage-bird than any other member of this family.

Tyrants (*Tyranninæ*) are American, and especially South American, birds. In their food and general

habits they resemble Flycatchers or Shrikes, according to their size, which varies a great deal; many also, such as the well-known American King-bird (*Tyrannus carolinensis*), domineer over other birds like the Drongos. From the Old-World groups which they resemble they may be distinguished by the scaling at the back of the shank. They are usually olive or grey in colour, and often have an orange or flame-coloured crest, usually concealed in repose. In America they are often called Flycatchers, as are Bee-eaters in India.

This is a group showing many forms. Some species have legs of ordinary length and hop about, or search for food on the ground, but the peculiarity of the shank above alluded to will distinguish them from the Warblers and Chats of the Old World. Their nesting-habits vary a good deal.

The above-mentioned King-bird is of the size of a lark, slaty-black above, with concealed red crest, and white below. In general shape and habits it is like a Flycatcher. The Phœbe (*Sayornis fuscus*) is much like our Common Flycatcher in size, form and habits, but much darker in colour. Like the last, it is a common and familiar bird, and a useful insect-destroyer. The large species, as big as thrushes, and strong billed, belonging to the genus *Pitangus*, are well known in the warm parts of America as "Kiskadees," or "Bentivis" from their characteristic cry. They eat small vertebrates, as well as insects, and even catch fish, and are found in gardens. The Sulphury Tyrant (*P. sulphuratus*) is the only species of Tyrant which has been at all freely imported into England alive.

Wagtails (*Motacillinæ*) are all small, about a Sparrow's size, though their tails are often decidedly long; have slender bills of moderate length, and the hind-claw long in some cases. The inner quills or tertiaries are exceptionally long, as is the case in the Larks, which

the Pipits, which also belong to this group, resemble in the streaky-brown plumage, although they can be distinguished by the back of the shanks not having separate scales. The Wagtails have the plumage black, grey and white, or olive-green and yellow. The birds of this family live mostly on the ground, running instead of hopping, and are almost entirely insectivorous; they build low down in banks on the ground.

Wagtails are for the most part confined to the Old World, over which they range widely, but do not reach Australia, the so-called Wagtail of that country being one of the Fantail Flycatchers, and having a lateral movement of the tail, whereas the true Wagtails move their tails up and down. They show the undulating flight of Passerine birds generally in its most typical form; they are strong flyers and many are migratory. Our common Grey Wagtail (*Motacilla melanope*) has a very wide range across the Old World, but the White Wagtail (*M. alba*), decidedly rare with us, goes further, even reaching Alaska and nesting in Iceland.

The Pipits are almost the most cosmopolitan of Passerine birds, being found nearly all over both worlds; one even (*Anthus antarcticus*) inhabits the island of South Georgia, and is the most southerly Passerine bird. These birds, as a rule, look much alike in their sombre plumage, but two or three South African species of the genus *Macronyx* are bright red or yellow below, *M. capensis* being known at the Cape as the "Cut-throat Lark"; it has an orange-red throat and paler breast.

Warblers (*Sylviinæ*) are small birds, seldom larger than a sparrow, and much resemble delicate-looking thrushes, of brown or olive-green colour as a rule, and devoid of the spotted young plumage. Moreover, the front of the shank is separately scaled as usual. They are mainly insectivorous, but some, like our Blackcap (*Sylvia atricapilla*), are also great fruit-eaters. This is an Old-World group, though one species invades

North America. Their nests vary, being usually open, but sometimes domed; the well-known Tailor-bird (*Sutoria sutoria*) and others which sew leaves for a nest-bag belong to this group. The Gold-crests (*Regulus*) are sometimes placed in a separate family.

The tree- and bush-haunting Warblers, like our familiar Chiff-Chaff (*Phylloscopus tristis*) and Blackcap, for instance, seldom come to the ground, and are eminently migratory, few breeding in the tropics. But there is a large group of short-winged, strong-legged Warblers resident in warm climates, which have much more terrestrial habits, and grade into the Babblers.

The Tailor-bird above-mentioned is one of these, and is the most familiar Warbler in the East. It is of about the same size as a Wren, and olive-green with a chestnut cap. This species has a loud note, but no noticeable song; many Warblers, however, are remarkably good songsters.

Wattled Pittas (*Philepittinæ*), of which there are only two species—*Philepitta jala*, black in the male and olive-green in the female, and *P. schlegeli*, in which both sexes are green and yellow, with the male's head black—are confined to Madagascar, where no true Pitta is found. They differ from the true Pittas by having separate scales at the back of the shank, while the males have a wattle over the eye. They keep more to the trees than the true Pittas, which mostly live on the ground.

Waxwings (*Ampelinæ*) are a curious group containing only a few species, found in Europe, Asia and America. They have small feet and a small bill with wide gape, but unlike most other birds so distinguished, are mainly frugivorous. Most of them are crested, and the best-known species, the Waxwing (*Ampelis garrulus*) of the northern parts of the world and the Cedar-Bird (*A. cedrorum*) of North America, develop sealing-wax-like appendages on the secondary wing-quills.

Our occasional visitor, the Waxwing, which is one of the few Passerine birds common to both hemispheres, is a sub-Arctic bird of very wandering habits and irregular habitat; but the Cedar-Bird, which is smaller and has yellowish-white instead of chestnut under the tail, is a regular inhabitant of the United States and a well-known bird. These Waxwings have long wings and a steady level flight.

Weavers (*Ploceinæ*), with which the Waxbills, Whydahs, and Nuns or Mannikins are classed, are the characteristic Finches of the warm parts of the Old World. They are usually shorter in wing and stouter in bill and feet than the true Finches. Moreover, the bill tends to run up on to the forehead in a peak, and the nostrils are sometimes exposed. The nest is usually covered, and often pendent. But for all this, the *Ploceidæ* are usually spoken of as Finches, and should not properly be separated. In habits they are much more social than true Finches, and the males in many cases have a very marked change of plumage after the breeding season, exchanging their gay red or yellow dress, varied with black, for the streaky-brown or olive-green plumage of the female. The typical weaving forms are mostly African, though a few, including the well-known Baya (*Ploceus baya*) of India, are inhabitants of Southern Asia. They build very wonderful pendent nests of woven grass or fibre, with the entrance at one side below, often prolonged into a spout. The Baya is a sparrow-like bird, the breeding male having a brilliant yellow cap and breast.

Another brilliant Weaver is the Madagascar species (*Foudia madagascariensis*), the breeding male being bright scarlet for the most part. This is often imported to Europe, but the commonest cage-bird among typical Weavers is the small Red-billed African species (*Quelea quelea*); in this the female has a yellow bill, and the

breeding male a pink or straw-yellow head and breast, usually with black mask.

The "Bishops" (*Pyromelana*) are remarkable for the rich red and yellow of the full-dressed males, set off by velvety black; several are commonly caged. The male Whydahs, in addition to displaying much black and often some red, in the male's breeding plumage, are noteworthy for the excessively long tail carried at that time. The most generally known in its own African haunts, though not so commonly caged as some others, is the Giant Whydah, or Sakabulla (*Chera procne*), as large as a lark, with the full-dressed male black, with a tail a foot long.

The Mannikins, Nuns and Waxbills are small, highly sociable species, often very beautifully coloured. The only one which changes its plumage is the Avadavat (*Sporæginthus amandava*) of India and eastwards, long a familiar cage-bird. It is of the size of a Wren, the breeding male wine-red, with small white spots. The Cordon-bleu (*Estrelda phœnicotis*) is very well known in Africa; it is but little larger than the last, and fawn and pale-blue in colour. The best known of this group is, however, an unusually large species, the Java Sparrow (*Munia oryzivora*), about as big as the true Sparrow, lavender-grey, with large rosy bill and black-and-white head. It is a very old cage-bird, and there is a white domestic breed. This group of birds, indeed, supplies a greater number of cage species than any other, and several breed regularly in captivity, and others occasionally, such as the splendid Gouldian Finch (*Poephila mirabilis*) of North Australia, of the size of a tit, green, with violet breast, yellow belly and black or red head.

Wood-hewers (*Dendrocolaptinæ*), which replace the Creepers and Nuthatches in South America, show the climbing type of Passerine foot, with the short inner and long outer toe, in its highest perfection;

the bill varying much in shape. They are often much bigger birds than Creepers or Nuthatches, and are brown in colour, often reddish, especially on the tail.

This group contains many species, varying much in type; some are not climbers at all, but hop, and even run on the ground, like the Oven-bird. These forms have not the typical foot, but can be distinguished from thrushes, warblers, or other birds they seem to resemble, by having the shanks scaled at the back. The nesting-habits vary much, and are often most remarkable: as witness the Oven-bird's curious domed clay structure and the great stick-nest of the Lenatero (*Anumbius acuticaudatus*).

Both these species are familiar birds in South America. The Oven-bird (*Furnarius rufus*) is reddish-brown, with a short tail, and about the size of a thrush. It walks with a peculiar strut, closing each foot as it lifts it, in a way unusual among Passerine birds, and has a shrill repeated scream like a kestrel. The Lenatero in size and colour resembles a lark, but is a perching bird, and has a rounded tail, showing white borders.

Wood-swallows or Swallow-Shrikes (*Artaminæ*) of the warm parts of the world—chiefly India and the Australian region—have much of the swallow's build, but are easily distinguishable by their much larger bills, which are fairly long and stout. They do not spend so much time on the wing as the true Swallows, and their nests are of quite a different type, being built in the ordinary way. They are sometimes classed with the Shrikes, and seem to be related to those birds.

They are about the size of starlings, with peculiarly sleek plumage, grey or black, with some white markings. The most widely-spread kind is the White-bellied Wood-swallow (*Artamus leucogaster*), with a white rump and abdomen; this ranges from the Andamans to Australia. In spite of their aerial mode of life, these birds bear captivity well, and the White-eyebrowed Wood-

swallow (*A. superciliosus*) of Australia, a grey bird, with white eyebrows, has been not infrequently imported.

Wrens (*Troglodytinæ*), which are found nearly everywhere, are sometimes classed with the Babblers; like them, they are short-winged, bush-haunting, insectivorous birds, but they differ in some points, notably in having no bristles at the base of the bill, in being much less sociable and much more generally gifted as songsters, besides building domed nests. Most of the Wrens are South American, and among them is the celebrated Organ-bird of the Amazonian region (*Cyphorhinus cantans*), renowned for its powerful and beautiful flute-like note. This bird is of a fair size, as many Wrens are, although the Old-World forms are nearly all small. Our own bird (*Troglodytes troglodytes*) has a wide range, and is represented by nearly allied forms from Iceland to Japan. The American House-Wren (*Troglodytes aëdon*) is very similar, but has a longer tail and is a little larger; like our species, it is a familiar garden bird. Most Wrens are plain-coloured, and have the sexes alike. They are difficult subjects for captivity, but the common Wren of Europe has been kept for some time.

Pelicans (*Pelecanidæ*).

Diagnosis.—*Large water-fowl, with long, narrow, flat bill and large pouch, and all four toes webbed.*

Size.—From that of a goose to larger than a swan.

Form.—*Bill* very long, narrow and flat, with a hook at the tip; branches of the lower jaw only united at the tip, and supporting a large pouch; *feet* with short shanks, and all four toes webbed, hind-toe pointing backwards, but with an inward inclination; *wings* very large, long and broad; *tail* short; neck long. Tongue very small.

PLUMAGE AND COLOURATION.—Feathering long and loose; colour mostly white or grey in adults, brown in young. Quills black. Pouch and face always bare. Little sex-difference, but some small seasonal change.

YOUNG.—Helpless, naked at first, then clad in pale down. The bill is quite short at first.

NEST.—A mass of sticks, rushes, etc., placed on trees or on the ground.

EGGS.—Several; white, rough.

INCUBATION.—A month to about seven weeks.

COURTSHIP.—The male crouches down and rubs his head to and fro with open bill and expanded pouch.

FOOD.—Fish, and occasionally young water-fowl.

GAIT.—A waddling walk. They swim rapidly and sit high in the water, but do not dive. They usually reach down from the surface for their food, but the American Brown Pelican (*Pelecanus fuscus*) marks its prey on the wing, and swoops down on it. They perch freely on trees as a rule.

FLIGHT.—Slow and powerful; they often soar on motionless wings. The feet are extended in flight and the neck drawn in.

NOTE.—A croak; they are very silent birds as a rule.

DISPOSITION AND HABITS.—They are sociable, and often fish in company, forming line and driving the fish into shallow water. They are almost constantly pluming themselves.

ECONOMIC QUALITIES.—They are usually regarded as harmful birds wherever the preservation of fish is important, on account of the quantity they destroy.

CAPTIVITY.—They thrive well confined, attaining to a very great age, and the common White Pelican has bred in Continental zoological gardens.

DISTRIBUTION AND IMPORTANT SPECIES.—Pelicans are found almost everywhere, by large bodies of fresh

water and on the sea shore, in warm and temperate climates, but there are less than a dozen species. The best known is the Common White or Roseate Pelican (*Pelecanus onocrotalus*) of South-East Europe and the adjacent countries and familiar in captivity; this has a pinkish blush on its plumage. The purely white Pelican (*P. trachyrhynchus*) of North America grows a deciduous horn on the bill in the breeding season. The American Brown Pelican is a small species of maritime habits and dark colour; the only South American kind (*P. molinæ*) is very similar. The large Australian Pelican (*P. conspicillatus*) is pied black and white. No Pelicans are found in Britain or New Zealand and the Pacific Islands.

Penguins (*Spheniscidæ*).

Diagnosis.—*Flightless diving-birds, with wings in the form of paddles, not folding, and without quills.*

Size.—From a weight of ninety pounds (*Emperor Penguin*) to the size of a wild-duck.

Form.—*Bill* various, with sheath marked by grooves, corner of mouth before eye; neck short, general form stout; *feet* with shanks very short and broad, and three stout webbed front toes; hind-toe very small, raised, and on the inside of the foot; *wings* paddle-like, flattened, hardly moving except at the shoulder; *tail* short or medium, with numerous feathers.

Plumage.—Exceedingly close and having a scaly appearance, especially on the wings, which have no true quills. Grey of some shade above, white below, often with black, and sometimes yellow, markings about the head. No sexual difference. Moult rapid, the feathers coming off in numbers, flaking off like a reptile's slough on the wings.

Photo copyright by W. P. Dando, F.Z.S.

Yellow-crowned Penguin (*Eudyptes antipodum*). (*See p.* 131.)

The photograph might have been taken on purpose to disprove the frequent assertion that these birds are plantigrades.

[*To face p.* 130.

Photo copyright by W. S. Berridge, F.Z.S.

Blue-tailed Fruit-pigeon (*Carpophaga concinna*). (*See p.* 138.)

This species is a good type of the tropical Fruit-pigeons; it is much larger than our Wood-pigeon, and coloured pale French-grey and metallic green.

YOUNG.—Active to some extent, but not feeding themselves, the parents disgorging into their bills, which they thrust into those of the old ones. They are clothed in thick uniformly-coloured down, and usually differ from the adults in first plumage. They fledge first on the wings.

NEST.—Various; a burrow, or a small collection of rubbish, such as twigs and pebbles. Sometimes none is made at all. They always breed in colonies.

EGGS.—One or two; white, or nearly so, unmarked.

INCUBATION.—Six weeks; those species which make no nest incubate standing, keeping the egg between the feet and abdomen. Both sexes sit.

COURTSHIP.—They stand face to face and rub their necks together.

FOOD.—Fish and other marine animals, which they swallow under water. They do not go to sea when moulting, and thus cannot feed then.

GAIT.—On land an awkward waddling walk or a hop. When pressed they go on all fours, using the wings as legs, but usually walk and stand erect. They are *not* plantigrade, as often stated, but walk on the toes like other birds (see illustration). They are most active at sea, where most of their time is spent, swimming with their wings, which are moved simultaneously; they often come up to breathe with a spring, like porpoises.

DISPOSITION AND HABITS.—They are very courageous, and will attack man on occasion at their breeding-places, using both bill and wings, as they also do when fighting with each other.

NOTE.—Harsh, a bray, croak, or wail.

ECONOMIC QUALITIES.—They are useful as food when nothing better is to be had, and their oil and skins have been utilized.

CAPTIVITY.—They live well in this condition, requiring,

of course, free access to water and plenty of fish as food. The Black-footed species (*Spheniscus demersus*) was bred successfully in the Jardin d'Acclimatation at Paris, in a small enclosure, with a very small pond and dog-kennels for nesting-places. Since then it has also bred in the London Zoological Gardens.

Distribution and Important Species.—The seas of the Southern Hemisphere, one species (*Spheniscus mendiculus*) only having a range much outside these, *i.e.*, round the Galapagos. They often form the chief animal life in Antarctic regions. About sixteen species are known, of which one, the Cape Penguin (*Spheniscus demersus*), is the only one really familiar, owing to its being common in captivity. The Rock-hopper (*Eudyptes chrysocome*), with its conspicuous yellow crest, is also well known. Penguins are well-known birds on the New Zealand and Falkland Islands coasts, but as a rule their breeding-places are on remote islands far away from human inhabitants.

Petrels (*Procellariidæ*).

Diagnosis.—*Web-footed birds, with tubular nostrils.*

Size.—From larger than a swan to the size of a swallow.

Form.—*Bill* of medium length or long, with hooked tip, the horny covering divided into sections by grooves, the nostrils tubular—the tubes either separate or fused—and the corner of the mouth in front of the eye. *Feet* with shanks of varying length, and three fully-webbed front toes, the hind-toe absent or only represented by its claw. *Wings* generally long and narrow; *tail* usually rather short.

Plumage and Colouration.—Colouring sombre, and

usually nearly self-coloured, or in large masses; no difference between the sexes or according to season. Young usually like adults.

YOUNG.—Downy, but helpless and fed by parents, who disgorge food into the young one's bill inserted into their own. The down is self-coloured, sooty or white.

NEST.—Usually a burrow; in Albatrosses a raised structure in the open, of earth and turf.

EGGS.—One; white, in some cases with red spots.

INCUBATION.—From one to two months.

COURTSHIP.—In the case of the Albatross the birds stand face to face, point their bills skyward, and utter a groaning sound.

FOOD.—Marine animals, ships' refuse, and carrion; some large species eat the smaller ones.

GAIT.—An awkward walk; many assume a crouching attitude when walking. They swim well as a rule, and some are also good divers.

FLIGHT.—Remarkably powerful in most, though they often have a difficulty in rising off a level surface either on land or water; they are adepts at sailing, especially the large species, and usually fly low. The small Petrels fly much like swallows. The neck is drawn in, and the feet stretched out behind, in flight.

NOTE.—Various, and rather discordant; groaning and cooing sounds are common.

DISPOSITION AND GENERAL HABITS.—Many of these birds are largely nocturnal, and few come inland voluntarily, so little is often known about them. Many, however, follow ships. They seem ravenous and not very intelligent.

ECONOMIC QUALITIES.—The young of some species are used as food locally, while all are of æsthetic value as enlivening vast stretches of ocean.

DISTRIBUTION AND IMPORTANT SPECIES.—They are

found in all seas, and at any distance from land, but are often localized in their breeding-haunts, and by far the larger number of species inhabit the southern seas; there are about a hundred and twenty in all.

The best known in northern waters are the little Stormy-Petrel (*Procellaria pelagica*), of a swallow's size—the smallest web-footed bird—and sooty black, with a white patch on the back, and the Common Shearwater (*Puffinus anglorum*), about the size of a pigeon, and black above and white below. Species of similar general appearance to these are found in all seas. The well-known Mutton-bird (*Puffinus brevicaudus*) of Australia is a dark Shearwater. The Fulmar (*Fulmarus glacialis*), a grey-and-white species of the size of a crow, is northern. In the southern seas a familiar bird is the Cape Pigeon (*Daption capensis*), about the size of a wood-pigeon, and white, spotted with black, with black head; well known also are the species of *Prion*, commonly called "Whale-birds," of about the size of blackbirds, and blue-grey in plumage. The Southern Diving-Petrels (*Pelecanoides*), the only short-winged members of the family, are about the same size, and black-and-white in colour. On the edges of the Ant-arctic ice is found the Snowy Petrel (*Pagodroma nivea*), about pigeon-size, a curious counterpart to the Ivory Gull of the Arctic regions. The largest of the Petrels is the Nelly (*Ossifraga gigantea*), a bird as big as a goose, normally sooty-brown, but often white or pied; it is a voracious scavenger, and attacks other birds on occasion; it is confined to southern waters.

The Albatrosses (*Diomedeinæ*), with nasal tubes separated from each other, are all large birds, chiefly haunting the southern seas, but one or two

range up the Pacific to Kamtchatka, and the well-known Mollymawk, or Black-eyebrowed Albatross (*Diomedea melanophrys*) has occurred in England and elsewhere in the North Atlantic region. It is about the size of the Great Black-backed Gull, and very similar in colour, but with a dark tail. The true Wandering Albatross (*Diomedea exulans*) is white with black wings and black freckling on the back.

PIGEONS (*Columbidæ*).

DIAGNOSIS.—*Land-birds, with four well-developed toes with no basal webs, and small heads, with bill soft at the base.*

SIZE.—From that of a sparrow to that of a small hen turkey (in the great Crowned Pigeons—*Goura*).

FORM.—*Bill* rather short, thinnest in the middle, soft at the base, where the nostrils are pierced; *feet* with short shanks, usually with one row of broad scales in front and quite bare behind, and four toes, the hinder one well developed and the front ones with no webs; *wings* variable, short to long; *tail* well developed, usually of medium length; head small, neck rather long, body heavy.

PLUMAGE AND COLOURATION.—Feathering dense, smooth, powdery, and loosely attached; colouration commonly drab or grey; but green is often found in fruit-eating forms, and metallic glosses on portions are common. Some are very brilliant. There is no seasonal change, and the sexes are oftenest alike; but the fledged young usually differ to some extent, commonly by buff or cinnamon edgings to the feathers.

YOUNG.—Very helpless, only clad in a very scanty long, hairlike down, sometimes even naked.

They are fed by the parents, inserting their soft swollen bills into the mouths of these. The first food is a milky secretion from the old birds' crops, which is later exchanged for the ordinary food of the parents softened.

NEST.—Very primitive in structure, an open platform of twigs or grass-stems; usually placed in a tree or bush, sometimes on the ground or in holes of trees, rocks, or buildings.

EGGS.—One or two; glossy and unspotted, white, rarely slightly tinted.

INCUBATION.—From two to four weeks.

COURTSHIP.—Very demonstrative, but differing much in different groups; the throat is usually distended, and the tail often spread, but not the wings. Sailing nuptial flights are indulged in by many species, especially the Turtle-doves.

FOOD.—Mainly vegetable, leaves, buds, grain and fruit; but worms and small snails, etc., are also eaten. They drink by a continued draught, not in sips.

GAIT.—A walk, graceful enough in the ground-feeders, but an awkward waddle in those which keep mostly to trees. Some of these tree-pigeons hop occasionally, and some ground species run quickly.

FLIGHT.—Swift and decided, usually by continued rapid strokes of the half-expanded wings. Some species sail at times, but none seem to soar for any distance, or to fly with slow strokes. The neck and legs are outstretched in flight.

NOTE.—Usually pleasant, a "coo" or purr; a whistle in some fruit-pigeons, and a boom, almost a roar, in others. There is a short, dull alarm-note, but except for the love-note they are silent birds.

DISPOSITION AND HABITS.—Pigeons are rather stupid on the whole; wary when molested, and quarrelsome in a weak sort of way. In fighting, they

use their wings much. The pairs show considerable devotion, and often caress each other with their bills, but they are not more attached in reality than many other birds. Most species perch, but a few are entirely terrestrial.

Economic Qualities.—They are edible, and some are very good ; but at times they are apt to be destructive owing to their fondness for cultivated crops. The fruit-eating species, however, are harmless, and useful in spreading trees, as they pass the seed undigested, while the smaller seed-eating species destroy much weed-seed.

Captivity.—They live very well indeed, even in cages, and usually breed ; few of the fruit-eaters, however, have as yet been reared in confinement. Two species are completely domesticated : the Common Pigeon, the ancestor of which is the wild Blue Rock (*Columba livia*), and the Collared Dove (*Turtur risorius*), which seems to have originated from the wild species *T. roseogriseus*.

Distribution and Important Species.—The Pigeons and Doves are found almost all over the world, except in the Arctic and Antarctic regions, even on the remotest islands; there are over five hundred species. Few frequent completely open country, as the ground-feeders usually breed and roost on trees, while the fruit-pigeons, naturally, always frequent wooded country. Most are found in hot climates, and few are migratory.

The Blue Rock-Pigeon is widely spread wherever there are cliffs in the Old World ; the tree-haunting Wood-Pigeon (*Columba palumbus*) is also widely distributed. Turtle-Doves (*Turtur*) are commonest in hot climates, and confined to the Old World ; in India the Spotted Dove (*T. suratensis*) is one of the commonest kinds, and the Collared Turtle (*T. decaocto*) is also common there and extends west

to Turkey; it is much like the domestic dove, but drab instead of fawn in colour.

In North America the Passenger Pigeon (*Ectopistes migratorius*), a blue-grey bird with a long tail, once excessively abundant, is now nearly extinct; the only widely-distributed North-American pigeon being the Mourning Dove (*Zenaidura macrura*), a drab bird, about the size of the common dove, but with a tail of more pointed shape.

None of the true fruit-pigeons are found in the New World, the fruit-eating species found there being allied to the typical pigeons, such as the Wood-Pigeon, and none are green; of the true green fruit-pigeons the best known is perhaps the Hurrial (*Crocopus phœnicopterus*) of India, a bird about as big as the house-pigeon, with green and lavender plumage and yellow feet. The large species called Imperial Pigeons are well typified by that illustrated.

The great Crowned Pigeons (*Goura*) of New Guinea and adjacent islands, are well known in captivity (at least, in the case of *G. goura*), and are noteworthy, not only for their great size, filmy fan-shaped crests and slate-blue colour, but for having the shanks covered all round with numerous small scales.

The extinct Dodo and Solitaire were huge heavy flightless Pigeons, referred to a separate family (*Didida*). The existing Tooth-billed Pigeon (*Didunculus strigirostris*) of Samoa, though it has a very peculiar thick beak, is not so much like them in this respect as the Thick-billed Green Pigeon (*Butreron capellii*), closely allied to the Hurrial above-mentioned.

PUFF-BIRDS (*Bucconidæ*):

DIAGNOSIS.—*Perching birds, with curved or hooked beak of moderate length, and small feet with toes in pairs, the front pair united.*

SIZE.—From that of a dove to smaller than a sparrow.

FORM.—*Bill* moderate in length, strong, with hooked tip or curved throughout, surrounded by bristles at the base; *feet* small, with short shanks, fourth toe turned back as well as the first, the two front toes united; *wings* usually short and rounded; *tail* moderate. Head large.

PLUMAGE AND COLOURATION.—Feathering full and loose, whence their name; colours sober, brown variegated with black, black-and-white, or nearly all black. Sometimes a sex difference, but no seasonal change. Bill often red or orange.

NEST.—In the case of the Swallow-winged Puff-bird (*Chelidoptera tenebrosa*), a hole in a bank.

EGGS.—White, and two in number, in the above species.

FOOD.—Insects, captured on the wing as a rule.

GAIT.—They do not move about much, but sit quietly perched; on the ground they hop.

FLIGHT.—Not long protracted, apparently, except in the swallow-winged species, which has long wings.

NOTE.—They are generally silent, but some utter loud cries.

DISPOSITION AND GENERAL HABITS.—They are sluggish and remarkably tame; the common Brazilian species (*Malacoptila torquata*), a brown buff-streaked bird of the size of a thrush, is locally known as *Joao doido* (Silly Johnny).

ECONOMIC QUALITIES.—They are, no doubt, useful in a small way as insect-destroyers.

CAPTIVITY.—I do not know that any have been kept.

DISTRIBUTION AND IMPORTANT SPECIES.—There are less than four dozen species, confined to the warm parts of America. The above-mentioned "Joao doido" seems to be the most familiar.

RAILS (*Rallidæ*).

DIAGNOSIS.—*Ground birds with no webs between toes, and stout flat-sided bills.*

SIZE.—From that of a large fowl to that of a sparrow.

FORM.—*Bill* flat-sided, varying in length and thickness, with nostrils well in front of base and corner of mouth below forehead or half-way to eye; *feet* with no web between toes; front toes usually long, hind-toe short, but long enough to reach the ground; *wings*, short, especially upper-arm and forearm; *tail* short. Head small, body flat-sided.

PLUMAGE AND COLOURATION.—Feathering soft and lax, generally plain-coloured, with seldom a sex-difference or seasonal change. Young differing somewhat from adults. Often a bare patch on forehead; eyes nearly always red.

YOUNG.—Active and downy, but for the first few days fed by parents; down uniform, black or dark brown. They cannot fly till nearly full-grown.

NEST.—A mass of reeds, grass, etc., placed on the ground, among reeds, or in a bush.

EGGS.—Several; spotted.

INCUBATION.—About three weeks.

COURTSHIP.—The white under tail-coverts are puffed out in many species.

FOOD.—Mixed, some being more feeders on insects and other small animals, and others on herbage and seeds.

GAIT.—A walk or run; they are very good runners,

By courtesy of the Oxford Museum.

Puff-bird (*Bucco chacuru*). (*See p.* 139.)

The present species is about the size of a Thrush, brown and white, variegated with black, and with the bill red. [*To face p.* 140.

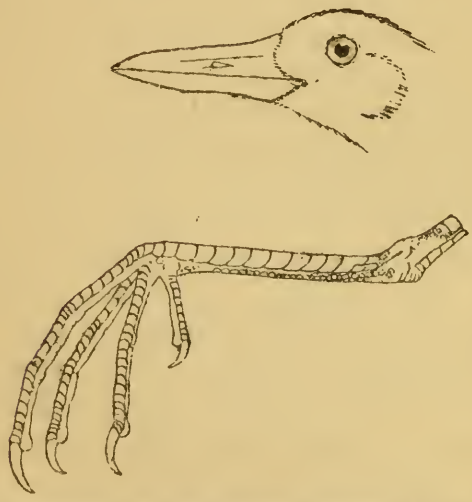
Photo copyright by W. P. Dando, F.Z.S.

Ypecaha Rail (*Aramides ypecaha*). (*See p.* 142.)

The Ypecaha is very typical in shape, but larger than Rails usually are, equalling a fowl. It is coloured brown and grey, with a black tail, green bill, and red legs.

and perch freely, readily climbing among vegetation. They can all apparently swim, and generally dive, and the Coots (*Fulica*), which have the toes fringed with skin, are as aquatic as ducks.

FLIGHT.—Steady and direct, performed by rapid flaps, with the neck and legs outstretched, the latter drooping down at first in a very characteristic way. They rise awkwardly, and never fly if they can help it, although often able to travel long



Head and foot of Rail (White-breasted Water-hen).

distances. There are several flightless species with short soft wings; more, in fact, in this family than in any other.

NOTE.—Various, usually harsh, a croak, cackle, shriek or booming sound.

DISPOSITION AND HABITS.—They are intelligent, wary, and courageous; usually they keep much to swampy cover, and are most commonly alone or in pairs.

ECONOMIC QUALITIES.—Many are good for food, a few occasionally destructive to crops and other

birds' eggs, while all destroy insects and other small vermin.

CAPTIVITY.—Rails do well in captivity and become very tame. A few species have bred in this condition. The large and beautiful blue thick-billed species of *Porphyrio* are those most commonly kept.

DISTRIBUTION AND IMPORTANT SPECIES.—Rails, of which about two hundred species are known, are found all over the world, even on the remotest islands. Many species are migratory. Our familiar Moorhen (*Gallinula chloropus*) and Coot (*Fulica atra*) have very wide ranges over the Old World, and are represented in America and Australia by very similar species. The Land-rail or Corn-crake (*Crex crex*) and Water-rail (*Rallus aquaticus*) are also widely-distributed in the Old World. In India the White-breasted Water-hen (*Amaurornis phoenicura*) is the most familiar species. In America the Clapper and Sora Rails (*Rallus crepitans* and *Porzana carolina*) are well-known forms and objects of sport. The former is much like our Water-rail, but larger; the latter somewhat like a small Moorhen, with white stripes.

The "Land-rail" of Australia is the beautiful Philippine Rail (*Hypotaenidia philippinensis*), with barred breast and cinnamon-spotted quills. In New Zealand the flightless Weka Rails (*Ocydromus*) are common, and amount locally to a nuisance in destroying eggs and young birds. The Wekas are streaky-brown birds as big as small fowls. The above-mentioned Porphyrios are confined to the warm parts of the Old World, though some very similarly coloured birds, much smaller (*Ionornis*), are found in America. The nearly-extinct New Zealand *Notornis* is a huge flightless *Porphyrio*. The Ypecaha illustrated is South American.

Rheas (*Rheidæ*).

Diagnosis.—*Large running flightless birds, with three toes and fairly large wings, folded as in ordinary birds.*

Size.—About four feet high or less.

Form.—*Bill* flat and short, with central nostrils and corner of mouth beneath centre of eye; *shanks* long; toes three, with no basal web; no hind-toe; *wings* fairly large, folded at elbow and wrist as in ordinary birds, covering the body like a cloak. No external *tail*. General form of body noticeably oval.

Plumage.—Lax and soft, but less so than in other large flightless birds; the wing-quills long, body-feathers short and close. Head, neck, and thighs all completely feathered. No sex-difference.

Young.—Active and feeding themselves; down hairy-looking, marked with a few light and dark longitudinal stripes, much like young game-birds.

Nest.—A hollow in the ground, scratched out by the male.

Eggs.—Numerous, unspotted, oval and smooth.

Incubation.—About six weeks, the male only sitting. The time appears to vary greatly.

Courtship.—The courting male droops his wings, which reach to the ground.

Food.—Grass, herbage, etc.; insects are the chief food of the young at first.

Gait.—A walk or very rapid run. They swim well.

Note.—A boom.

Disposition, Habits, etc.—Wary, but easily tamed if taken young. The breeding male is savage, attacking with both bill and foot.

Economic Qualities.—The long wing-plumes are called "Vautour" (vulture) in the feather trade, and are a good deal used. They can be collected,

and are so on some Argentine estancias, by driving in and plucking the birds. Clipping would, of course, be better. The flesh is good eating, something between mutton and turkey, and the gizzards have been used for the preparation of pepsin.

CAPTIVITY.—Rheas do well in captivity, both in hot and temperate climates. They breed regularly in European parks.

DISTRIBUTION AND SPECIES.—South America only, in open grassy country. There are only two species, the Common Rhea (*Rhea americana*), larger, with grey plumage, black on the crown and at the base of the neck, which lays creamy-white eggs; and Darwin's Rhea (*Rhea darwinii*), smaller, brown, spotted with white, and laying pale green eggs. This is confined to Patagonia. Both species are locally known as ostriches.

ROLLERS (*Coraciidæ*).

DIAGNOSIS.—*Tree birds of medium size, with crow-like bills and feet with four free toes, the hind-toe smallest.*

FORM.—*Bill* medium, strong, crow-like, corner of mouth below eye; *feet* with shanks medium or short, toes four, all free, hind-toe smallest; *wings* short to long; *tail* medium to long; head large, body light.

PLUMAGE AND COLOURATION.—Feathers close and beautifully coloured, blue, purple, green and lilac being common tints. No sexual difference, as a rule, nor seasonal change, but young are not always like parents.

YOUNG.—Naked and helpless, fed by parents.

EGGS.—Several; pure white.

INCUBATION.—About three weeks

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Common Rhea (*Rhea americana*). (*See p.* 144.)

The above position is often assumed by large birds of many kinds, generally by long-legged ones, but also by some diving-birds.

[*To face p.* 144.

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Malayan Porphyrio (*Porphyrio calvus*). (*See p.* 142.)

This species is black above and blue below; the New Zealand Pukeke (*P. melanonotus*) is similar, but larger.

COURTSHIP.—The male towers up in the air and swoops down.

NEST.—A hole in a tree, bank, or building, sometimes roughly lined, sometimes not.

FOOD.—Almost exclusively animal, consisting of insects and any small vertebrates they can swallow whole, for they do not use their feet in holding food. They usually watch for food from a fixed perch, and dart down on it. They cast up pellets.

GAIT.—The long-winged forms seldom move on the ground, and do so by hops; the short-winged Ground Rollers run about actively.

FLIGHT.—The ordinary long-winged Rollers fly strongly, with an easy flapping flight, sometimes tumbling over, or playing other antics on the wing. The flight of the short-winged kinds is weak.

NOTE.—Loud and harsh, a croak or cackle. They are rather noisy birds.

DISPOSITION AND HABITS.—They are sluggish and unsociable; vicious and not very intelligent. They usually sit with the throat feathers puffed out, and often jerk the tail.

ECONOMIC QUALITIES.—Besides their very ornamental appearance, they are recommended by their great usefulness as vermin-destroyers.

CAPTIVITY.—They will live well in an aviary, and one species, the Common European Roller (*Coracias garrula*), has bred under such conditions.

DISTRIBUTION AND IMPORTANT SPECIES.—The family, including about three dozen species, falls into two types: the ordinary long-winged, short-legged Rollers (*Coraciinæ*), found all over the warmer parts of the Old World; of these the Common Roller (*C. garrulus*) sometimes visits England, and the Indian Roller (*C. indicus*) is well known in India as the "Blue-jay"; the short-winged, long-legged Ground Rollers (*Brachypteraciinæ*) are confined

to Madagascar, where they inhabit forests. The Kirombos (*Leptosomatinæ*), two very nearly allied species found in Madagascar and the Comoro Islands, are long-winged and short-legged, like ordinary Rollers, but have the feathering advancing on the bill and the outer toe reversible. The male is metallic bronze-green above and grey below, the female brown and buff with black spots.

SAND-GROUSE (*Pteroclidæ*):

DIAGNOSIS.—*Ground-birds of medium size with fowl-like bills, long wings, and short feathered legs.*

SIZE.—About that of a common pigeon or dove.

FORM.—*Bill* small, fowl-like; *feet* with short feathered shanks and three front toes and a small useless hind-toe, the latter sometimes absent; *wings* pointed, long, or very long; *tail* rounded or pointed, rather short, but middle feathers often long and pointed. Head small; body plump and squat, very flat-backed.

PLUMAGE.—Close, coloured mainly sandy, grey, and black; belly often all black. A seasonal change in some cases; usually a sexual difference. Young like old female.

YOUNG.—Downy and active, feeding themselves; down speckled; the male parents in species bring them water by soaking their breast-feathers and letting the chicks suck these.

NEST.—None; the eggs being laid on the bare ground in a hollow scratched out.

EGGS.—Usually three; oval, spotted.

INCUBATION.—Twenty-four days; the female sitting by day, the male at night.

FOOD.—Seeds, herbage, and a few insects. They drink regularly, in a long draught like pigeons.

GAIT.—A walk or run, easier than would be expected from their shape.

FLIGHT.—Swift and direct, by continuous strokes of the wing; they can travel long distances.

DISPOSITION AND HABITS.—They are sociable, but rather quarrelsome. They dust instead of bathing.

NOTE.—A double croak or cackle.

ECONOMIC QUALITIES.—They are very fair eating, and carry more breast-meat than any other game-birds; they are good sporting birds.

CAPTIVITY.—They are easy to keep, and two species have bred, *Pterocles alchatus* and *P. exustus*.

DISTRIBUTION AND IMPORTANT SPECIES.—The dry regions of the Old World, usually in open country. There are about seventeen species; the best known generally, owing to its repeated invasions of Europe, and even our islands, is Pallas's three-toed Sand-grouse (*Syrrhaptes paradoxus*), a migratory species with very long pointed wings.

SCREAMERS (*Palamedeidæ*).

DIAGNOSIS.—*Large marsh-birds, with fowl-like bills and two-spurred wings.*

SIZE.—About that of a domestic goose.

FORM.—*Bill* fowl-like, but corner of mouth below forehead; *feet* with stout shanks, thighs bare above hock, toes four, all well-developed and on same level, two outer front ones connected by a short web. *Wings* large, broad, with two spurs on the pinion-joint. *Tail* short, broad. Head small, neck rather long, body bulky.

PLUMAGE.—Dull, with no sexual difference, and young like parents.

YOUNG.—Active and feeding themselves, much like goslings; down without markings. In the Crested

Screamer (*Chauna cristata*), yellow, with olive back ; the body fledges before the wings, as in ducks.

NEST.—A mass of vegetable matter, on the ground or in shallow water

EGGS.—Several ; oval, spotless, tinted white.

INCUBATION.—Seven weeks (Crested Screamer in London Zoological Gardens).

COURTSHIP.—Nothing but a slight raising of the wings.

FOOD.—Grass and aquatic herbage.

GAIT.—A slow walk ; they swim readily, sitting high, and sometimes perch.

FLIGHT.—Heavy but powerful, rather like a vulture's ; they can soar with ease.

DISPOSITION AND HABITS.—Peaceable, except when breeding ; slow and rather sluggish ; they caress the young affectionately. In fighting they use the spurred wings.

NOTE.—A loud repeated scream or a hiss. The male and female call together.

ECONOMIC QUALITIES.—Their flesh is good, much like that of a wild duck. They will also care for young poultry at times.

CAPTIVITY.—They do well, feeding on soft vegetable food (soaked bread and boiled rice) and green stuff. They have been successfully bred and reared in the London Zoological Gardens.

DISTRIBUTION AND SPECIES.—South America only, in marshes. There are only three species : the Kamichi or Horned Screamer (*Palamedea cornuta*), black with a few white markings, and with a slender horn on the head ; the Chakar, Chaja, or Crested Screamer (*Chauna cristata*), grey, with a narrow crest, and the Derbian Screamer (*C. derbiana*), similar to the last, but darker and smaller.

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Chajá or Crested Screamer (*Chauna cristata*). (*See p.* 148.)

The bulky appearance of the body and legs is due to air-cells in the skin.

[*To face p.* 148.

Photo copyright by H. Pither.

Secretary-bird (*Serpentarius secretarius*). (*See p.* 149.)

The characteristic shape is well shown, but the drooping of the nearer wing is of course not normal.

Secretary-bird (*Serpentariidæ*).

Diagnosis.—*A bird of eagle-like aspect, but with very long legs like a wader's.*

Size.—Large, about that of a hen-turkey, but with much longer legs.

Form.—*Head* much as in an eagle, with strong hooked bill, but with the eyes furnished with eye-lashes; *wings* long; shanks long, but the legs are feathered above the hock, not bare there as in most long-legged birds; four toes, the three front ones all joined at the base by a short web; *tail* long, the two centre feathers much the longest; *neck* long, body light; *legs* feathered down to hocks.

Plumage and Colouration.—Mostly grey, with black quills and thighs; sides of face bare, a long straggly drooping crest at back of head; sexes nearly alike; young duller, the black thighs pencilled with white.

Young.—Helpless, covered with white down and fed by parents; said not to be able even to stand for months.

Nest.—A large open structure of sticks, placed in a tree.

Eggs.—Two or three; white, marked with reddish.

Incubation.—Six weeks.

Food.—Reptiles, including poisonous snakes, and small ground birds and beasts. They strike their prey with one foot as if with a hammer.

Gait.—A stately walk, or a very quick run; they can keep this pace up for a long time.

Flight.—Stately in appearance, but not enduring; swift dogs can run them down.

Disposition and Habits.—Harmless except to animals small enough to eat; easily tamed.

Note.—A guttural rattling cry.

Economic Qualities.—They are protected as useful destroyers of snakes, etc., but are also destructive to young game-birds and beasts.

Captivity.—They live well in confinement, whether in an aviary or allowed to run about outside, the only difficulty in their management being the readiness of their legs to break, which fractures do not unite.

Distribution.—Africa, chiefly south of the Sahara, in open dry country. Only the one species is known.

Seed-snipes (*Attagidæ*).

Diagnosis.—*Quail-like birds, with long sharp wings like snipe, short beaks, and short legs, with no webs between toes.*

Size.—From that of a turtle-dove to that of a thrush.

Form.—*Bill* short, much like a partridge's, but corner of mouth not reaching back further than forehead; *feet* with shanks short, covered with small scales all round, front toes without webs, hind-toe small and useless. General shape partridge-like, but for the large pointed wings; *tail* short, rounded or pointed.

Plumage.—Mottled brown. No seasonal change; a sexual difference in some.

Young.—Downy and active; down speckled as in a young Plover or Snipe, or grey.

Nest.—Slight, a few stalks in a hollow in the ground.

Eggs.—Pale stone colour, thickly speckled with brown; four in number.

Food.—Seeds and herbage.

Gait.—A walk.

Flight.—Vigorous and active, as in snipe.

Note.—Similar to a snipe's, or whistling.

Disposition and Habits.—They are sociable, and live in open country, sometimes high up in mountains.

Economic Qualities.—They are good eating.

Captivity.—They can be kept, but have never been brought to Europe.

Distribution and Species.—South America. There are only five species, of which the best-known is the Common Seed-snipe (*Thinocorys rumicivorus*).

Sheathbills (*Chionididæ*).

Diagnosis.—*White shore-birds, with short thick beaks and longish legs, with small useless hind-toe.*

Size.—About that of a crow.

Form.—*Bill* short, stout, covered with a horny sheath at base; *feet* with medium shanks, a short web between the two outer front toes, hind-toe small and useless. General proportions moderate, wings rather long and pointed, with spurs at the pinion in males; *tail* medium.

Plumage and Colouration.—White; no sexual difference. The face is more or less naked and covered with warts.

Young.—Downy and active; plain grey in colour. First plumage white as in adults.

Nest.—Rough, placed in a hole or hollow on the ground.

Eggs.—Two or three, white, with many red markings.

Courtship.—Somewhat as in pigeons.

Food.—Shore animals, eggs, seaweed, carrion.

Gait.—A walk or run; they can swim on occasion.

Flight.—Said to be like that of a pigeon; they may sometimes be found far out at sea.

Note.—A chuckle.

Habits.—Tame and inquisitive with man; pugnacious and destructive to other birds.

Economic Qualities.—They are good to eat, at any rate at times.

Captivity.—They live well, but are seldom to be seen in this state; they have never been bred, though one (*Chionis alba*) has several times been kept at the London Zoological Gardens.

Distribution and Species.—The shores and islands of the South Atlantic. There are only three species, called "Sore-eyed Pigeons" and "Paddy-birds" by the whalers.

Shore-birds (*Charadriidæ*).

Diagnosis.—*Ground-birds of moderate or small size, with hind-toe very small or absent, and corner of mouth below forehead.*

Size.—From that of a pheasant to that of a sparrow.

Form.—*Bill* with corner of mouth far forward, level with forehead, and never very stout, but otherwise very variable, sometimes short and pigeon-like, sometimes long, and with a varying curvature; *feet* with usually rather long shanks, and legs usually bare above the hock; three front toes, often more or less webbed; hind-toe always small and useless, often wanting; *wings* moderate, pointed or rounded, with tertiary quills often long; spurred on the pinion-joint in some Lapwings; *tail* short. Head large in Plovers, smaller in other groups.

Plumage and Colouration.—Colouring seldom brilliant, usually drab or brown, sometimes streaked or spotted above, and white below. Seldom a sex-difference, but usually a more or less marked seasonal change. Females sometimes brighter and often larger than males. Young usually with a distinct plumage, but not a very striking one.

YOUNG.—Active, and feeding themselves from the first; very protectively coloured, the down striped or peppered above, and white below. The species with long bills have short bills when chicks. They are nearly full-sized before they can fly.

NEST.—A mere "scrape" on the ground, as a rule. A few Sandpipers lay in old nests of other birds.

EGGS.—Large for the size of the birds, somewhat pear-shaped, and usually four in number; darkly spotted on a drab or olive ground.

INCUBATION.—Three to four weeks. In many cases the male only sits.

COURTSHIP.—Varied; the male often assumes a stooping posture, but does not usually droop his wings. Many play in the air. Several species assemble for courtship and fighting, as the Ruff (*Pavoncella pugnax*) and Great Snipe (*Scolopax major*).

FOOD.—Chiefly insects, worms, molluscs, etc., for which they often bore. Ground berries and shoots are also eaten, and sometimes seeds. They are constant feeders, and eat a great deal.

GAIT.—A walk or rapid run. They swim at need and some dive well. A few perch.

FLIGHT.—Usually strong and vigorous, with continuous flapping of the wings, which are usually not fully extended. Many species play about in the air. The feet are extended behind, and also the neck by long-necked species.

NOTE.—Varied; whistling, mewing, or cackling. Some Sandpipers sing or trill when courting.

DISPOSITION AND HABITS.—They are usually social, very lively, and pugnacious to a greater extent than would be supposed from their delicate structure. They fight chiefly with the wings.

ECONOMIC QUALITIES.—Many are excellent vermin-destroyers, and the flesh and eggs are often much appreciated as food.

Captivity—They are easily kept, and a few have bred (Ruff, Redshank, Avocet, Cayenne Lapwing).

Distribution and Important Species.—This is a numerous family of birds, containing about two hundred species and individually abundant. It is also the most migratory group, and some members of it are found everywhere, though most breed in the north. Our Turnstone, indeed (*Strepsilas interpres*), is the most widely distributed of all birds, being found on every shore in the world, though only breeding in the north. This species, and its two allies, the Black-headed Turnstone (*A. melanocephala*) and the Surf-bird (*Aphriza virgata*) of America, are intermediate between Sandpipers and Plovers. Some of the typical Plovers are found everywhere; our Golden Plover (*Charadrius pluvialis*), which has the wing-lining white, is replaced in Eastern Asia and America by a very similar species (*C. dominicus*), with the wing-lining dark drab, and little Plovers of the Ring-plover (*Aegialitis*) type inhabit every shore; one of them, the Kill-deer (*Aegialitis vocifera*) is the common inland Plover of North America.

The broad-winged Plovers known as Lapwings, however, are less migratory, and more limited in distribution; there are none in North America and New Zealand. The Common Lapwing of India (*Sarcogrammus indicus*) is called from its cry, "Did-he-do-it"; it has a black crown, cherry-red bill, brown back, and yellow legs. The Teru-teru, or Cayenne Lapwing (*Vanellus cayennensis*) is the common species of South America; it is somewhat like our bird, but larger and lighter-coloured, and has a pink spur on the pinion-joint. The Australian Lapwing

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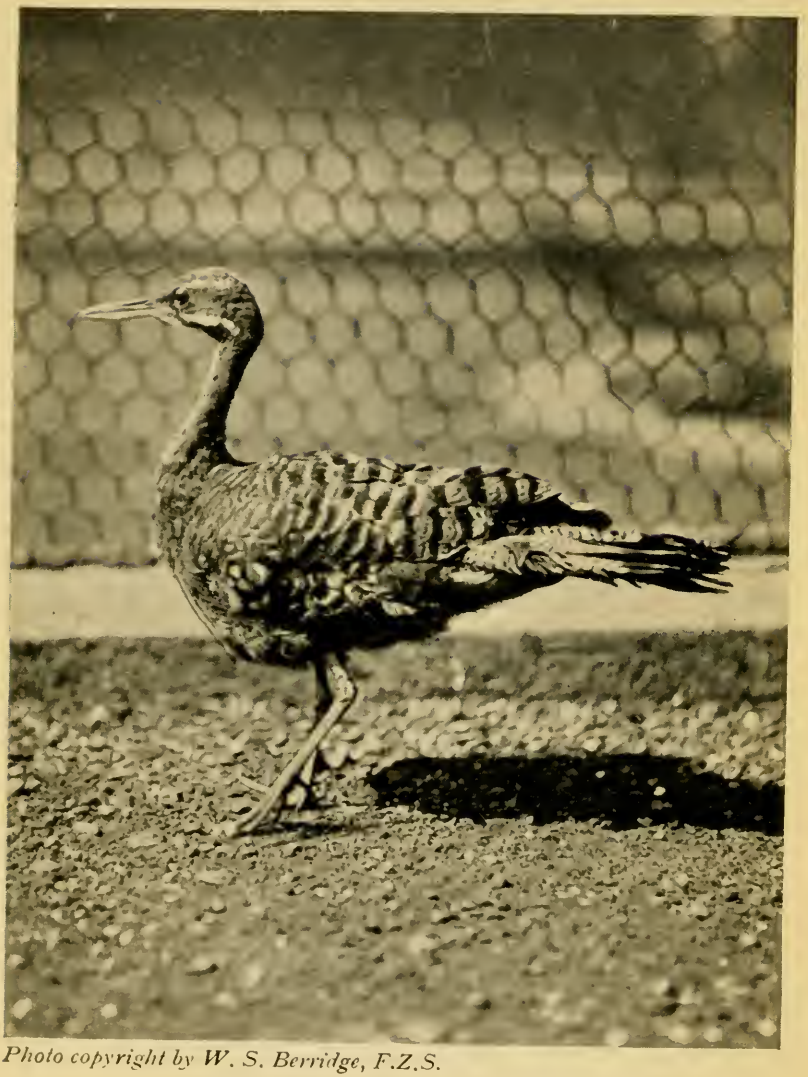
Australian Wattled Lapwing (*Lobinanellus lobatus*). (*See p.* 155.)

This large Lapwing is nearly as big as a Crow, brown, black, and white, with bright yellow bill and face-wattles. [*To face p.* 154.



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Sun Bittern (*Eurypyga helias*). (*See p.* 158.)

The picture well shows the close-feathered neck, long tail, and short hind-toe, all very different from the true Bitterns, which have a long hind-toe and full ruff on the neck.

(*Lobivanellus lobatus*), conspicuous by its yellow face-wattles, is also a well-known bird in its own country.

The Woodcocks and Snipes also have a wide distribution; the American Woodcock (*Philohela minor*) is smaller than ours, and has not the dark and light markings on the breast and primary quills; the American Snipe, however (*Scolopax wilsoni*), is almost identical with ours. Some very big Snipes (*S. gigantea, S. nobilis*) inhabit South America. The Australian Snipe breeds in Japan. The so-called Painted Snipes (*Rostratula*) are confined to warm climates all round the world; they are not nearly related to the true Snipes, and have the bill slightly bent down and the wings beautifully spotted. The Indian species (*R. bengalensis*) is also found in Africa, and is very close to the Australian form. Its general hue is olive green, the quills French-grey spotted with buff. The hen is larger and brighter than the cock.

The Avocets (*Recurvirostra*), Stilts (*Himantopus*), and Oyster-catchers (*Haematopus*) are usually pied birds, the first with up-turned bills, the second with very long legs, and the third with strong chisel-tipped red beaks; all have representatives everywhere; and our two species of Phalaropes (*Phalaropus*), which have the toes fringed with a web as in coots, and swim much, are widely spread, though breeding in the north only.

The Sandpipers are of universal distribution, and the Curlews, with their down-bent beaks, nearly so, but no Curlew is found in New Zealand. An inland Sandpiper (*Bartramia longicauda*), with a rather long tail, is a well-known and esteemed game-bird in North America, and called there Upland Plover. The Ruff (*Machetes pugnax*), of the Old World, is renowned for the male's frill

and tippet, variable in colour, assumed at the breeding-season, and for his pugnacity at that time; it is the only polygamous bird in the family.

Storks (*Ciconiidæ*).

Diagnosis.—*Large, tall wading-birds, with long stout bill; all front toes webbed at base, and well-developed hind-toe.*

Size.—Always large, from nearly three feet high to nearly five.

Form.—*Bill* long, stout, straight, or curved at tip (only in the *Tantalus* group), corner of mouth reaching half-way to eye, nostrils basal; *legs* bare above hock, shanks long, three front toes webbed at base, hind-toe well developed; claws usually short and blunt; *wings* large, broad; *tail* short. Neck long.

Plumage and Colouration.—Feathering close, coloured black, white and grey, the black usually with metallic gloss; some species (*e.g.*, Adjutant) are powdery. Space between bill and eyes always bare, in some the whole head and neck. Under tail-coverts sometimes very strong and stiff, sometimes downy. Sexes alike; seldom a seasonal change, but young usually different from adults, being brown in many cases.

Young.—Helpless and clothed in short down.

Nest.—An open platform of sticks, usually placed on trees or rocks.

Eggs.—Several; white.

Incubation.—About a month.

Courtship.—In the White Stork the male lays his head on his back and erects his tail, clattering his bill; the Marabout (*Leptoptilus crumeniferus*) expands his downy under tail-coverts.

FOOD.—Fish, frogs, snakes, molluscs, and small animals generally ; some eat carrion.

GAIT.—A slow walk.

FLIGHT.—Stately and powerful, with slow flaps or motionless gliding ; they soar very high. Both neck and legs are usually extended ; but the Indian Adjutants draw the neck in.

DISPOSITION AND HABITS.—Storks are (except to their prey) harmless and somewhat sociable birds ; at times they are playful, at others they remain quiet for a long time. They perch much, but are not so active in trees as herons. Though waders, they rarely or never wash, and seldom even plume themselves, while they often have dirty legs.

NOTE.—Usually only a clattering of the bill ; but breeding Adjutants bellow, and the young of some species utter a wheezing croak.

CAPTIVITY.—Storks live remarkably well in captivity, and the Common White Stork has bred.

ECONOMIC QUALITIES.—They are chiefly useful as vermin destroyers, but in India the Open-bill (*Anastomus oscitans*) and White-necked Stork (*Dissura episcopus*) are eaten as "Beefsteak birds."

DISTRIBUTION AND IMPORTANT SPECIES.—There are about twenty species, found chiefly in hot climates all over the world ; but in North America only the Wood-Ibis (*Tantalus loculator*) is found. The Common White Stork (*Ciconia alba*) is well known as a summer migrant in Europe and Western Asia ; in its winter quarters in South Africa it is known as the Great Locust-bird ; the Adjutant (*Leptoptilus dubius*) is familiar in India. It is bald-headed, and grey, and stands about four feet high. The South American Jabiru (*Mycteria americana*) is equally large, but white, with bald black head.

Sun-bitterns (*Eurypygidæ*).

Diagnosis.—*Wading-birds, with long rail-like beak, small hind-toe and large tail.*

Size.—About that of a crow.

Form.—*Bill* like a long-billed rail's, with central nostrils, and corner of mouth half-way to eye; *legs* bare above hock, with long shanks and four toes, the two inner front ones united at base by a small web, the hind-toe small but touching the ground; *wings* large, broad and rounded; *tail* large and broad. Neck very slender, body light.

Plumage and Colouration.—Feathering powdery, barred and mottled with black, brown, and buff. Wing and tail quills beautifully banded with chestnut and ochre-yellow, these colours concealed in repose. No sex-difference or seasonal change; young in first plumage like adults.

Young.—Clothed in variegated down like a young snipe; it does not leave the nest, but does not gape, pecking the food from the parent's bill.

Nest.—An open platform of mud and sticks, etc., placed on a tree.

Eggs.—Several; spotted.

Incubation.—Twenty-seven days.

Courtship.—Probably the expansion of the beautiful wings and tail, a common gesture, is that used in courtship.

Food.—Insects, small fish, etc.

Gait.—A slow stealthy-looking walk.

Flight.—Very light and butterfly-like.

Disposition and Habits.—A quiet, harmless, but unsociable bird.

Note.—A metallic whistle, or a grating hiss when alarmed.

Economic Qualities.—These birds are useful insect destroyers.

CAPTIVITY.—They have done well in the London Zoological Gardens, and reared young there.

DISTRIBUTION AND PRINCIPAL SPECIES.—Two species only (*Eurypyga helias* and *E. major*) are known, much like each other, inhabiting South America and living by the waterside in wooded places.

SWIFTS (*Cypselidæ*).

DIAGNOSIS.—*Swallow-like birds, with the first toe the smallest, and only ten tail-feathers (as against twelve in swallows).*

SIZE.—From that of a blackbird to that of a tit (allowing for shape).

FORM.—Much as in swallows, with small bill and feet and long wings. *Bill* with corner of mouth coming below eye; *feet* with very short shanks, usually feathered, and never scaled, first toe smallest and often directed inwards and forwards instead of backwards; *wings* very long; *tail* long or short, forked, square or rounded; in latter case often with spinous tips to quills.

PLUMAGE AND COLOURATION.—Black and white commonly, but sometimes showing brown or metallic blue and green; usually no sex-difference, and no seasonal change. Fledged young much like adults, but with light edgings to the feathers.

YOUNG.—Naked and helpless, fed by parents.

EGGS.—One to four; pure white, elongated in form.

NEST.—Various, usually on rocks or buildings, sometimes on trees; made more or less of the birds' sticky saliva.

INCUBATION.—Eighteen days.

FOOD.—Insects, usually captured on the wing. (I have, however, once seen a *Collocalia* picking insects off a tree as it swept past.)

GAIT.—An awkward crawling walk; they are planti-

grade, not standing upon the toes. They climb and cling well, but only a few perch on trees in the ordinary way. They are seldom seen otherwise than on the wing.

FLIGHT.—Swift and easy, some being said to be the swiftest of all birds. Sometimes they cannot rise off the ground, but not by any means always.

NOTE.—A twitter or scream. They never sing as some swallows do.

DISPOSITION AND HABITS.—Lively and sociable; they are also courageous, often turning sparrows and swallows out of their nests.

ECONOMIC QUALITIES.—Except when they displace swallows, they are highly beneficial by reason of their feeding habits. One species (*Collocalia francica*), which builds entirely with its sticky saliva, produces the valuable "edible birds'-nests" of Eastern commerce.

CAPTIVITY.—They have never been kept in this state for any length of time.

DISTRIBUTION AND IMPORTANT SPECIES.—There are about a hundred species in this family, which is found all round the world, chiefly in warm, but also in temperate climates; those frequenting the latter migrate south in winter; there are none in New Zealand. The familiar sooty-brown British species (*Cypselus apus*) extends over a large part of the Old World; but the common Swift of tropical Africa and India is *Cypselus affinis*, smaller and blacker than the British species, with a white patch on the back. The Great Alpine Swift (*Cypselus melba*), light brown above, white below, is also a widely-distributed European species, but only a straggler in England. The common Swift of North America is the Chimney Swift (*Chaetura pelasgia*), black, with a spiny tail, building a nest of glued twigs in chimneys.

THICK-KNEES OR STONE-PLOVERS (*Œdicnemidæ*).

DIAGNOSIS.—*Plover-like birds, with stout bills, the corner of the mouth reaching half-way to the eye, and three toes all webbed at the base.*

SIZE.—Larger than most Plovers, from the size of a jackdaw to that of a hen pheasant.

FORM.—Much as in Plovers, with large head and eyes, the latter always some shade of yellow. *Bill* stout, with corner of mouth half-way to eye ; *feet* with long shanks, thickened at the hock, finely scaled all round, with three short toes all webbed at base ; *wings* large ; *tail* pointed, rather short.

PLUMAGE AND COLOURATION.—Either light brown, streaked or mottled with darker, or plain drab. Flight feathers and side tail-quills boldly marked black and white. No sex-difference or seasonal change ; fledged young resembling adults.

YOUNG.—Stone-coloured, with small dark markings above. First plumage as in adults.

EGGS.—Two only ; relatively large, olive or brown, with black markings.

INCUBATION.—Between a fortnight and a month, apparently.

COURTSHIP.—Probably the display mentioned below.

FOOD.—Insects, worms, snails, small vertebrates.

GAIT.—A quick walk or run.

FLIGHT.—Not very fast, performed by continuously repeated strokes of the wings.

NOTE.—A whistle or shriek.

DISPOSITION AND HABITS.—They are shy, nocturnal, and unsociable, being usually seen alone and in pairs. They have a peculiar habit of rushing about with wings and tail expanded at times, and when wishing to hide, lie along the ground with outstretched necks.

ECONOMIC QUALITIES.—They are useful in destroying small vermin, and do no harm at all. Some species are good eating.

CAPTIVITY.—They live well in confinement, but are not often kept, and have not bred in this state.

DISTRIBUTION AND IMPORTANT SPECIES.—Warm and temperate regions all round the world, except in North America and New Zealand. There are about a dozen species. They are usually resident, and generally haunt dry places. Our migratory species, the Stone-curlew or Norfolk Plover (*Œdicnemus œdicnemus*), ranges widely across the Old World; in India it is known as Bastard Florican. In the latter country a large species, the Great Stone-Plover (*Esacus magnirostris*), is common, haunting river banks. It is plain drab, with very large bill and eyes. In Australia the most familiar representative is the long-legged *Burhinus grallarius*, and in South Africa the Dikkop (*Œdicnemus capensis*). The species illustrated (*Œ. bistriatus*) is one of the largest.

TINAMOUS (*Tinamidæ*).

DIAGNOSIS.—*Partridge-like birds with nostrils in middle of bill and no webs at base of toes.*

SIZE.—From that of a hen-pheasant to that of a thrush.

FORM.—*Bill* short to rather long, with central nostrils, and sheath divided into pieces by grooves; corner of mouth below eye, tongue very short; eye with eyelashes; *feet* with shanks of medium length and three short toes not united at the base by webs, and usually a small useless hind-toe; *wings* short and rounded; *tail* not noticeable, of small soft feathers. Head

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Double-banded Thick-knee *(Œdicnemus bistriatus)*. *(See p. 161.)*

This Central American species is much larger than our "Stone Curlew," and has a cinnamon crown with black band on each side.

[To face p. 162.

Photo copyright by W. P. Dando, F.Z.S.

Rufous Tinamou (*Rhynchotus rufescens*). (*See p.* 163.)

This species is about as big as a Pheasant, and in colour dun barred with black, with cinnamon primary quills.

small, neck rather long, body heavy, with prominent thighs.

PLUMAGE AND COLOURATION.—Powdery, brown, or grey, either uniform or barred or speckled; no seasonal change or sexual difference, but the hen is larger; young like adults.

YOUNG.—Much like young rheas, clad in hairy-looking down. They fledge very soon.

NEST.—None; eggs being laid on bare ground.

EGGS.—Several; oval, unspotted, richly coloured and with a glazed appearance.

INCUBATION.—Three weeks; it is performed by the male only.

COURTSHIP.—In the Rufous Tinamou the male stands up and displays his quills, stretching them downwards and forwards.

FOOD.—Grain, herbage, insects, etc.

GAIT.—A walk or run.

FLIGHT.—Heavy and direct, by continuous vibration of the wings; they cannot fly far.

DISPOSITION AND HABITS.—They are rather stupid; the hen is thoroughly masculine in character, and seems to mate with several males.

NOTE.—A whistle, often very beautiful.

ECONOMIC QUALITIES.—They are excellent eating, and good sporting birds, passing as partridges in South America.

CAPTIVITY.—They live well, and some species have bred.

DISTRIBUTION AND IMPORTANT SPECIES.—There are about seventy species, confined to Mexico, Central and South America, chiefly in wooded or grassy country. They are usually ground-birds, but at least one roosts at night. The most familiar species is the Rufous Tinamou (*Rhynchotus rufescens*), often imported to Europe, as large as a small fowl, and barred black and dun, with cinnamon primary quills and a long bill.

Todies (*Todidæ*).

Diagnosis.—*Small perching birds with long flat bills, rather long legs, and front toes joined.*

Size.—About that of a wren.

Form.—*Bill* long, straight and flat; *feet* with rather long shanks, and three toes in front, more or less united, and a smaller hind-toe. *Wings* and *tail* short.

Plumage and Colouration.—Green, with a red throat; there is no sex-difference or seasonal change. The species only differ in colouration of the sides.

Young.—Naked and helpless.

Nest.—A hole dug out in a bank, slightly lined with grass, etc.

Eggs.—Several; pure white.

Courtship.—The plumage is ruffled up and wings drooped.

Food.—Insects, and generally captured on the wing in darts.

Gait.—They seem not to move about much on their feet, but apparently hop.

Flight.—Short and rapid, but feeble.

Note.—A soft, plaintive squeak.

Disposition and Habits.—They are sluggish and solitary.

Economic Qualities.—Like other insect-eating birds, they no doubt have their utility as pest-destroyers.

Captivity.—They have been reared from the nest in one instance, but never brought to Europe.

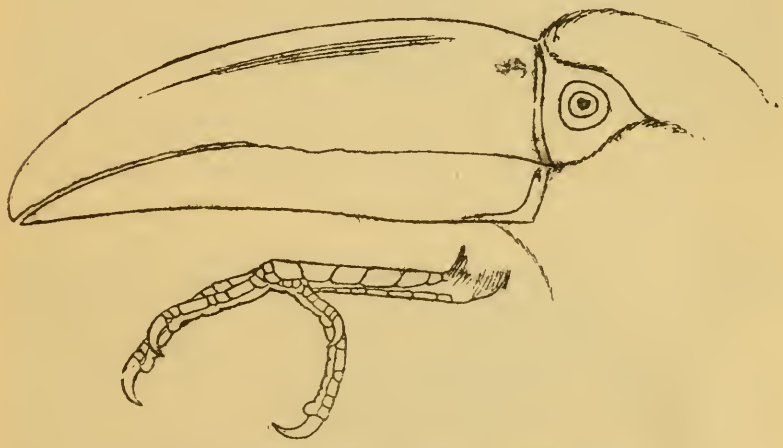
Distribution and Important Species.—There are but four, very similar, forms, confined to the West Indian Islands. The best known is the Green Tody of Jamaica (*Todus viridis*), sometimes called "Robin Redbreast" in that island.

Toucans (*Rhamphastidæ*).

Diagnosis.—*Pair-toed birds of medium size, with enormous beaks, curved in profile.*

Size.—From that of a rook to that of a missel-thrush.

Form.—*Bill* enormous, curved in profile, with nostrils at the very base, and corner of mouth reaching to front of eye; *feet* with short strong shanks, and fourth toe as well as first turned back, so that the toes are in two pairs; *wings* short; *tail* rather



Head and foot (from the inside) of large Toucan.

long, rounded or wedge-shaped; head large. Tongue long, and fringed at the edges.

Plumage.—Brightly coloured; black or green, with contrasting patches of yellow and red, as a rule. A bare patch round eyes, usually brightly tinted, as is also the enormous bill. Sexes alike or different; young like adults.

Young.—Naked, and fed by parents; the bill has not nearly attained its full size when they are fledged.

Nest.—A hole in a tree.

Eggs.—Two; white and glossy.

Food.—Fruit and small animals.

GAIT, ETC.—An awkward hop when on the ground, to which they seldom venture; they also hop sideways along boughs and jump quickly from one to another, most of their life being spent in trees.

FLIGHT.—Rather heavy and laboured, with constant flaps of the short wings; the feet are drawn up and the neck stretched out.

DISPOSITION AND HABITS.—Intelligent and apparently affectionate; sociable among themselves, but often mischievous and cruel to other birds. They sleep with the tail turned over the back.

NOTE.—A yelp; they are often very noisy.

ECONOMIC QUALITIES.—They are esteemed as food where they are found.

CAPTIVITY.—They are hardy and amusing birds where confined, and in a large aviary some species at least will stand a good deal of cold. None have bred in confinement.

DISTRIBUTION AND IMPORTANT SPECIES.—There are about sixty species, found in the warmer parts of America, in forests; the Hill Toucans (*Andigena*) ascending the Andes to a temperate climate. The small, wedge-tailed, dark-green species are called Araçaris. One species of these, the Lettered Araçari (*Pteroglossus inscriptus*) is frequently imported into England; it is about the size of a dove, dark-green above, yellow below, with cream-coloured bill curiously marked with black. The Sulphur-breasted Toucan (*Rhamphastos carinatus*), as big as a rook, black, with sulphur breast and bill coloured green, red and blue, is also not uncommon in captivity. The small species illustrated exemplifies the Toucanets (*Selenidera*), which closely approach the Barbets, to which Toucans are nearly allied.

Spotted-billed Toucanet (*Selenidera maculirostris*). (*See p.* 166.)
In this Toucan the bill is hardly larger than in some Barbets; the bird is about as big as a Dove.

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Boat-billed Heron (*Cancroma cochlearia*). (*See p.* 56.)
Although the bill of this bird is broad and boat-shaped, in other respects it closely resembles the Night Herons.

[*To face p.* 166.

Photo copyright by W. S. Berridge, F.Z.S.

Great-billed Touracou (*Turacus macrorhynchus*). (*See p.* 168.)

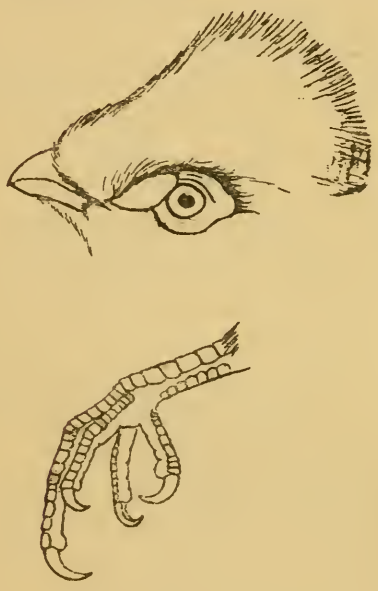
The prevailing colour of this bird is green, with the wings and tail of metallic blue and the bill yellow; the red in the wing is mostly concealed in repose.

Touracous (*Musophagidæ*).

Diagnosis.—*Medium-sized tree-birds, with short stout bill, and outer toe united by a short basal web to middle one.*

Size.—From a pheasant's to a jay's; mostly the latter.

Form.—*Bill* short, stout, upper profile curved, corner of mouth below eye; *feet* with rather



Head and foot of Touracous.

short shanks, and four toes, the first, or hinder, smallest, the fourth also usually turned back, though united by a web at base to the middle one—thus the toes are generally in pairs, though sometimes, and always in death, the outer toe comes forward. Head small, almost always crested; neck rather long. *Wings* short and rounded; *tail* long and rounded.

Plumage and Colouration.—Feathers rather hairy

in texture, generally beautifully coloured with green and purple, sometimes grey. Most of the high-coloured forms have carmine primary-quills concealed in repose. No sexual difference or seasonal change; the young much resemble adults.

YOUNG.—Not very active, remaining in the nest and fed by parents, clad in dark-coloured down without markings. They crawl about by aid of their wings.

EGGS.—Three; greenish or bluish-white.

INCUBATION.—Three weeks.

NEST.—A platform of twigs in a tree or bush.

FOOD.—Fruit and small animals, such as insects and worms.

GAIT.—They keep mostly to the trees, springing from one bough to another very lightly, and running along the boughs like pheasants on the ground. When they do visit the ground they run there very rapidly also.

FLIGHT.—Very light and graceful, but probably not enduring. The feet are tucked up in front when in flight, and the neck extended.

NOTE.—Loud, and not much modulated.

ECONOMIC QUALITIES.—They are not beneficial where fruit is grown, but do not seem to be very harmful; they are extremely ornamental.

DISPOSITION AND HABITS.—They seem to be sociable and playful; sometimes spiteful to other birds. They spring and strike with their feet when fighting.

CAPTIVITY.—They do very well when confined, and one species (*Turacus macrorhynchus*) has been bred successfully in England.

DISTRIBUTION AND IMPORTANT SPECIES.—There are about three dozen species, found in Africa south of the Sahara, in forest and wooded plains. The best known species is perhaps the plainest, the

Gray Touracou, or Quay-bird (*Schizorhis concolor*), detested by sportsmen for its habit of alarming game. Touracous are called Loories at the Cape.

Trogons (*Trogonidæ*).

Diagnosis.—*Pair-toed birds, with the outer toe of each pair shorter than the inner.*

Size.—From that of a pigeon to that of a lark.

Form.—*Bill* short, stout, with the outlines curved,

Head and foot (from the inside) of Trogon.

and corner of mouth below eye; *feet* small, with short shanks, the first and second toes turned backwards, instead of the first and fourth, as usual in pair-toed birds; hence the outer toe of each pair is the smallest, unlike what is found in the others. *Wings* moderate, with narrow, curved, stiff quills. *Tail* long, with the feathers squared at the tips.

Plumage and Colouration.—Plumage soft and usually brilliant, often showing metallic green or bright red, and also fine black-and-white pencilling. Often a sexual difference, but no seasonal change.

Young.—Helpless, and fed by parents; but they are little known.

NEST.—A hole in a tree or bank.

EGGS.—White or tinted; two to four in number.

INCUBATION.—About three weeks.

FOOD.—Insects and fruit; chiefly or entirely the former in Old World species. Food is usually taken on the wing, the bird darting out to catch an insect or pluck a fruit, and then returning to its perch.

GAIT.—They seem not to hop or walk about, but to either fly or remain perched.

FLIGHT.—Whirring when flying a short distance, undulating when going far.

NOTE.—Rather discordant; clucking, whistling, or chattering.

DISPOSITION AND HABITS.—They are solitary, unsocial and quiet, frequenting forests.

ECONOMIC QUALITIES.—As insect destroyers they are serviceable, and the fruit they take is only wild berries; they are also very ornamental.

CAPTIVITY.—The Indian Red-headed Trogon (*Harpactes erythrocephalus*) has been kept in captivity at the Calcutta Zoological Garden, and an American species in the New York one; the ancient Aztecs also used to keep the Quezal (*Pharomacrus mocinno*) for the sake of its plumage.

DISTRIBUTION AND IMPORTANT SPECIES.—The family, which includes about fifty species, is found, in warm regions only, all round the world, but not in Australia; and only two species are African. The only species generally known—as they are never abundant or familiar birds—is the celebrated Quezal of Central America, above-mentioned, figured on the Guatemala stamps. It is as large as a pigeon, intense golden-green, with red abdomen, and with the male's upper tail-coverts a yard long.

Tropic-Birds (*Phaëthontidæ*).

Diagnosis.—*Long-winged sea-fowl, with long pointed tails, and all the toes united by a web, and non-hooked bill.*

Size.—About that of a crow or small gull.

Form.—*Bill* nearly straight, upper outline curved, horny covering uniform, with distinct slit-like nostrils and corner of mouth reaching below eye; *feet* small, with very short shanks and all toes united by a web, the first very small and turned inwards; *wings* very long; *tail* long and pointed, the centre feathers especially long. Head large, neck short.

Plumage and Colouration.—Feathering satiny, colouring mostly white or very pale; no sexual difference or seasonal change. Adults with central tail feathers very long; young with the upper plumage black-barred. Bill red or yellow, eyes and toes dark.

Young.—Helpless and fed by parents; clothed in very full fluffy white down.

Nest.—None, the birds breeding in an unlined hole in a rock or tree.

Egg.—One; white, mottled with brown.

Food.—Sea-fish, on which the birds swoop from the air.

Gait.—An awkward waddle; they seldom need to walk, but perch quietly when not flying; they are not often seen at rest even on the water.

Flight.—With rapid continuous beats of the wings, like a duck's.

Note.—A harsh scream or prolonged whistle.

Disposition and Habits.—They are brave birds, resenting intrusion when nesting. They are usually seen well out at sea, generally singly or at most in pairs, and almost always on the wing.

Economic Qualities.—The tail-feathers are used as ornaments by various island savage races. They do no harm, and are very ornamental.

Captivity.—I know no case of any species being kept in this condition.

Distribution and Species.—They are found in warm seas all round the world, but are not abundant birds, and there are only six species. They breed in islands. With the exception of the Red-tailed Tropic-Bird (*Phaethon rubricauda*), which has the long centre tail-feathers red, and the Orange Tropic-Bird (*P. fulvus*), which is of a salmon-orange colour, they all look much alike. They are called Boatswain-birds by sailors.

Trumpeters (*Psophiidæ*).

Diagnosis.—*Ground-birds of moderate size, with short, fowl-like bill, long legs, and two outer front toes webbed at the base.*

Size.—About that of a fowl.

Form.—*Bill* short, fowl-like; *feet* with long shanks, toes moderate, two outer front ones webbed at base; hind-toe short, elevated, and useless; *wings* fowl-like, short and rounded; *tail* very short, not noticeable. Head small, neck rather long.

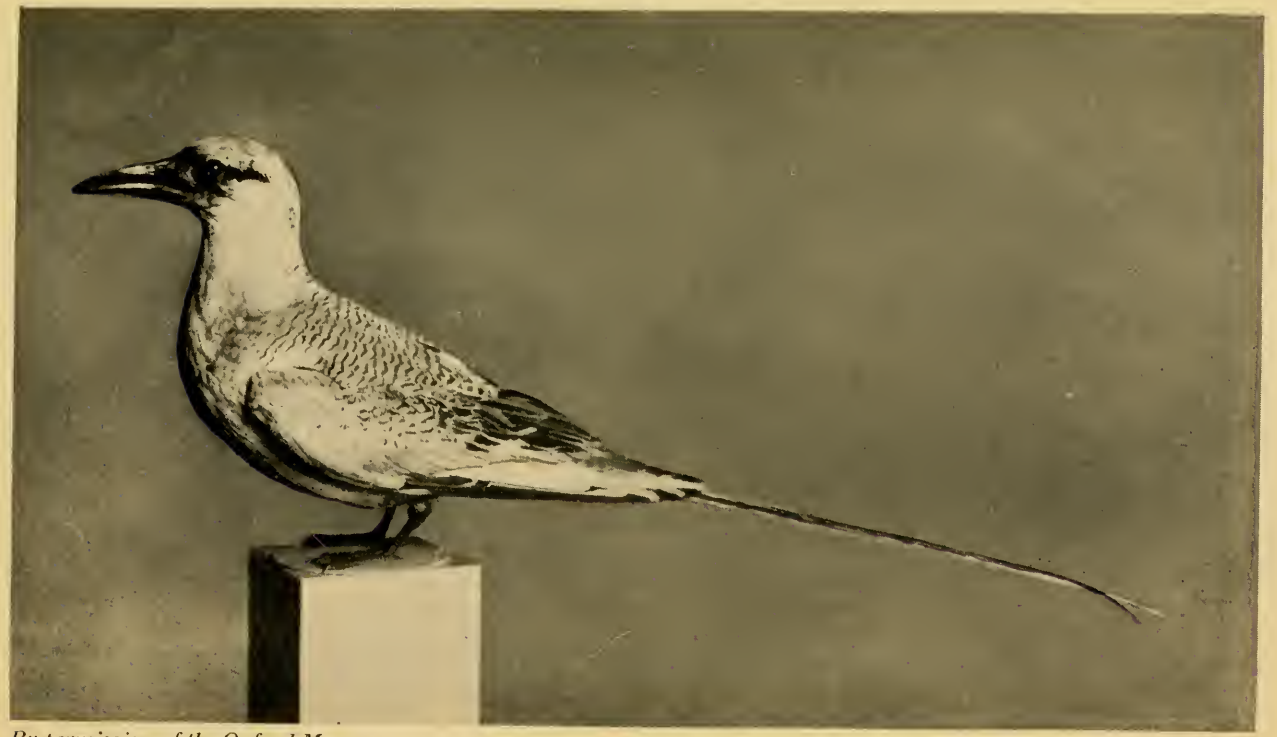
Plumage and Colouration.—Feathering dark, close and velvety on head, green or purple, metallic and scaly-looking on breast, back covered with a mantle of long, loose grey, white, or green fathers. No sex-difference or seasonal change. Legs usually green.

Young.—Active and downy.

Nest.—On the ground.

Eggs.—White, with a greyish or yellowish tinge.

Food.—Grain, fruit, etc., much as in pheasants.



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Tropic-bird (*Phæton æthereus*). (*See p.* 171.)

In general appearance this bird much resembles a large Tern, except that the long tail-feathers are in the middle of the tail, not at the outside.

[*To face p.* 172.

Photo copyright by Capt. Flower.

Whale-headed Stork (*Balæniceps rex*). (*See p.* 173.)

This bird is of a slaty-grey colour, and stands about four feet high. The bill is yellow, with darker mottlings.

GAIT.—A walk or run ; they are active birds, and can run long distances, and swim in case of need. They perch freely.

FLIGHT.—Weak and not protracted far.

HABITS AND DISPOSITION.—They are sociable, courageous, intelligent birds, living in flocks. They bathe freely.

NOTE.—A very curious, inward, prolonged, rumbling sound.

ECONOMIC QUALITIES.—They are sometimes used to protect and look after poultry.

CAPTIVITY.—In this state they live well, and get so tame as not to need confinement in any way, following their owners about. They fight or make friends with other animals, and altogether show an unusual amount of character.

DISTRIBUTION.—There are only about six species, found in the forest regions of South America. All are much alike, being distinguished chiefly by the colour of the back. The most familiar is the Common Trumpeter (*Psophia crepitans*), which is usually on view at the Zoological Gardens.

WHALE-HEADED STORK (*Balaenicipitidæ*).

DIAGNOSIS.—*A large stork-like bird, with short and very bulky bill:*

SIZE.—About four feet high.

FORM.—*Bill* rather short, very broad and deep, boat-shaped, in fact, and hooked at the tip ; corner of mouth below eye ; legs long as in storks generally ; *feet* with long toes, none webbed at the base ; *wings* large, tail short. *Head* large, crested slightly at back.

PLUMAGE AND COLOURATION.—Plumage grey, with paler

edges to the feathers; no sex-difference or seasonal change. Young browner than adult.

YOUNG.—Helpless at first, apparently, but they seem to run about fairly early.

NEST.—On the ground.

EGGS.—White.

FOOD.—Fish and aquatic reptiles, also the entrails of dead animals.

GAIT.—A walk.

FLIGHT.—High and powerful.

NOTE.—A clattering of the beak.

DISPOSITION AND HABITS.—Sociable; frequenting marshes.

ECONOMIC QUALITIES.—Probably useful as a scavenger.

CAPTIVITY.—The species was exhibited in 1860 in the London Zoological Gardens, and recently at those of Cairo.

DISTRIBUTION AND IMPORTANT SPECIES.—One species only (*Balaeniceps rex*) is known, from the country watered by the Upper White Nile.

WOODPECKERS (*Picidæ*).

DIAGNOSIS.—*Tree-birds, with straight beak of medium thickness and toes in pairs, or one only behind.*

SIZE.—From that of a crow to that of a tit.

FORM.—*Bill* of medium length and stoutness, straight or very slightly curved, usually compressed and chisel-tipped, corner of mouth coming half-way to eye; *feet* with short shanks and strong sharp curved claws, two toes in front and usually two behind, sometimes only one behind, the inner hind or first toe being in some cases rudimentary or wanting; *wings* of medium length or short; *tail* medium or short, usually very stiff and serving as a support. Head large, neck rather long in

some. Tongue very long and extensible, hard and barbed at tip.

PLUMAGE AND COLOURATION.—Varied in colour, very commonly black and white, sometimes olive-green, or brown, never showing any blue, but very often red or yellow; no seasonal change, but usually a small difference between the sexes. Young differing little from parents; sex-difference apparent at once.

YOUNG.—Naked and helpless, fed by parents; they have bare, swollen skin at the gape, and a warty pad on the hock, as nestlings, and move about in the nest on their hocks.

NEST.—A hole pecked out in a tree or bank.

EGGS.—Several, pure glossy white.

INCUBATION.—A fortnight, or a little more.

COURTSHIP.—In the American Flicker (*Colaptes auratus*) the male displays his wings.

FOOD.—Chiefly insects, especially wood-borers and shelterers under bark; berries, fruit, nuts, and sometimes the sap of trees, are also taken by some. They usually seek food on trees, but some feed on the ground.

GAIT.—On the ground they hop awkwardly, but on the trees they are very active, seldom hopping from bough to bough, but climbing up and round the trunks and large branches; they descend, if at all, tail first.

FLIGHT.—Usually somewhat undulating, a few beats of the wings alternating with closure of them for a moment. The feet are carried tucked up in front, and the neck extended.

NOTE.—Usually harsh, a cackle or "laugh"; sometimes a piping sound.

DISPOSITION AND HABITS.—Shy unless protected, unsociable as a rule, and often rather quarrelsome. Young birds in some cases will fight violently as soon as fledged.

Economic Qualities.—They are, on the whole, most useful, destroying insects injurious to timber.

Captivity.—They live well if reared from the nest, but are very quarrelsome with each other; they become very tame and make good pets. They have not been bred, in England at all events.

Distribution and Important Species.—This family, numbering nearly three hundred and fifty species, is found all over the world except in the Australian region, almost always in wooded country, though a few frequent the ground or rocks; they are, on the whole, resident, few being migratory. The family includes three sections, the typical Woodpeckers (*Picinæ*), with the typical structure and habits of the family, and found throughout its range; the Piculets (*Picumninæ*), tiny birds with rather the habits of tits, and numbering only a few species, found in West Africa, South-East Asia, and South America; and Wrynecks (*Iynginæ*), with very finely-pencilled plumage and normal tails, including our well-known migratory species and a few others, confined to the Old World outside Australia. Our commonest Woodpecker in England is the Green (*Gecinus viridis*,) about the size of a pigeon, olive-green, with red crown and yellow patch above tail; in India the Golden-backed (*Brachypternus aurantius*), with the crown red and upper surface dull golden, is the best known; and in North America the Golden-winged or Flicker (*Colaptes auratus*), a dove-brown bird, with spotted breast, barred back, and red crescent on the back of head, and with the quill-shafts bright golden yellow.

INDEX.

Adjutant, 157.
Albatrosses, 134.
Amazons, 91.
American Vultures, 1.
American Warblers, 95.
Ani, White, 22.
Ant-birds, 96.
Apteryx, 74.
Argus Pheasant, 44.
Auks, 3.
Avadavat, 126.
Avocets, 155.

Babblers, 97.
Barbets, 4.
Bearded Reedling, 97.
Bee-eaters, 6.
Beefsteak-birds, 157.
Bell-birds, 102.
Birds-of-Paradise, 98.
Birds' nests, edible, 160.
Birds of prey, diurnal, 25.
Bitterns, 56.
Blackbirds, 118, 120.
Black-cock, 44.
Blight-birds, 98.
Blue-bird, 118.
Boat-bill, 56.
Boatswain-birds, 172.
Bobolink, 120.
Bob-white, 42.
Bonxie, 53.
Booby, 46.
Bower-birds, 99.
Broadbills, 100.
Budgerigar, 91.
Bulbuls, 100.
Buntings, 106.
Burgomaster, 53.
Bustards, 8.
Buzzards, 27.

Canary, 105.
Capercailzie, 44.
Caracara, 28.
Cardinal, 106.
Carrion-crows, 2, 107.
Cassowaries, 11.
Cat-bird, 119.
Cedar-bird, 124.
Chacalacca, 24.
Chaja, 148.
Chats, 117.
Chickadee, 120.
Chuck-Will's widow, 83.
Cock-of-the-Rock, 102.
Cockatoos, 91.
Colies, 81.
Colins, 42.
Condor, 2.
Coots, 141.
Copper-smith, 6.
Corncrake, 142.
Coursers, 15.
Cow-birds, 121.
Crab-Plover, 17.
Cranes, 18.
Crazy Widow, 77.
Creepers, 103.
Crocodile-bird, 16.
Crow-pheasant, 22.
Crows, 103.
Cuckoos, 20.
Cuckoo-shrikes, 113.
Curassows, 23.
Curlews, 155.
Cut-throat Lark, 123.

Dabchicks, 49.
Darters, 13.
Dippers, 118.
Diurnal Birds of Prey, 25.
Dodo, 138.
Doves, 137.
Drongos, 104.
Ducks, 30.

Eagles, 27.
Emu, 11.

Falcons, 27.
Fantail, 107.
Finches, 105.
Finfoots, 34.
Flamingoes, 35.
Flicker, 176.
Florican, 9.
Flower-peckers, 106.
Fly-catchers, 107.
Fowls, 43.
Francolins, 43.
Frigate-birds, 37.
Frog-mouths, 38.
Fulmar, 134.

Game-birds, 40.
Gannets, 45.
Geese, 32.
Goldcrests, 124.
Grebes, 47.
Greenlets, 108.
Grouse, 42.
Griffon Vultures, 27.
Guacharo, 49.
Guans, 24.
Guillemots, 4.
Guinea-fowls, 42.
Gulls, 50.

Hammerkop, 54.
Hang-nests, 120.
Harriers, 28.
Hawks, 27.
Hedge-sparrow, 97.
Hell-divers, 49.
Herons, 56.
Hoatzin, 58.
Honey-eaters, 108.
Honey-guides, 59.
Hoopoes, 61.
Hornbills, 62.
Humming-birds, 65.

Ibises, 67.

Jabiru, 157.
Jaçamars, 68.
Jaçanas, 69.
Jackass, Laughing, 74.
Jackdaw, 104.
Jays, 104.
" Joao doido," 139.
Jungle-fowl, 43.

Kagu, 71.
Kaka, 92.
Kea, 92.
Kestrels, 27.
Kill-deer, 154.
King-bird, 122.
King-crow, 105.
Kingfishers, 72.
Kirombos, 144.
Kiskadee, 122.
Kites, 28.
Kittiwakes, 53.
Kiwis, 74.
Koel, 21.

Lämmergeier, 27.
Lapwings, 154.
Larks, 108.
Limpkins, 76.
Locust-birds, 16, 157
Lories, 91.
Lyre-birds, 109.

Macaws, 91.
Mallard, 33.
Mamos, 110.
Manakins, 110.
Mannikins, 125.
Marabou, 156.
Martins, 115.
Mergansers, 33.
Mesites, 77.
Mocking-birds, 119.
Mollymawk, 135.
Monaul, 43.
Moorhen, 142.
Morepork, 36.
Motmots, 78.
Mound-birds, 79.
Mouse-birds, 81.
Mutton-bird, 134.
Mynahs, 113.

Native-companion, 20.
Nelly, 134.
Night-hawk, 83.
Night-heron, 57.
Nightingales, 118.
Nightjars, 82.
Noddies, 53.
Nuthatches, 110.

Oil-bird, 50.
Open-bill, 157.
Organ-bird, 128.
Orioles, 111, 120.
Osprey, 28.
Ostriches, 84, 144.
Oven-birds, 96, 127.
Owls, 86.
Ox-peckers, 114.
Oyster-catchers, 155.

Paauw, 9.
Parrots, 88.
Partridges, 43.
Passerine birds, 92—128.
Pea-fowl, 43.
Pelicans, 128.
Penguins, 130.
Petrels, 132.
Phalaropes, 155.
Pheasants, 42.
Phœbe, 122.
Piculets, 176.
Pigeons, 135.
Pipits, 123.
Plant-cutters, 112.
Plovers, 154.
Ptarmigans, 44.
Puff-birds, 139.
Puffin, 4.

Quails, 42.
Quay-bird, 169.
Quezal, 170.

Rails, 140.
Raven, 103.
Red-birds, 117.
Redstarts, 96, 117.
Regent-bird, 100.
Rheas, 143.
Rice-bird, 121.
Road-runner, 22.
Robins, 117, 121, 97.
Rock-hopper, 132.
Rollers, 144.
Rook, 104.
Ruff, 155.

Sage-cock, 45.
Sand-grouse, 146.
Sandpipers, 155.
Satin-bird, 99.
Screamers, 147.
Scrub-birds, 112.
Secretary-bird, 149.
Seed-snipes, 150.
Shags, 15.
Shearwaters, 134.
Sheathbills, 151.
Sheldrakes, 33.
Shrikes, 113.
Skimmers, 53.
Skuas, 53.
Snake-birds, 14.
Snipes, 155.
Solitaire, 138.
Sparrows, 106.
Spoonbills, 67.
Starlings, 113.
Stilts, 155.
Stone-Curlew, 162.
Storks, 156.
Sugar-birds, 114.
Sun-birds, 115.
Sun-bitterns, 158.
Surf-bird, 154.
Swallows, 115.
Swallows, Wood, 127.
Swans, 32.
Swifts, 159.

Tailor-bird, 124.
Tanagers, 116.
Tapaculos, 117.
Terns, 53.
Teru-teru, 154.
Thrushes, 117.
Tinamous, 162.
Tinker, 6.
Tits, 119.
Todies, 164.
Toucans, 165.
Touracous, 167.
Tragopans, 43.
Trogons, 169.
Tropic-birds, 171.

Trumpeters, 172.
Tui, 108.
Turkey, 41.
Turkey, Brush-, 80.
Turkey, Plains, 9.
Turkey-Buzzard, 2.
Turnstone, 154.
Tyrants, 121.

Umbrella-birds, 102.

Vultures, 1, 26.

Wagtails, 122.
Warblers, 123.
Water-hens, 142.
Wattle-birds, 108.
Wattled Pittas, 124.
Waxwings, 124.
Weavers, 125.
Wekas, 142.
Wheatear, 117.
Whip-poor-Will, 83.
White-eyes, 98.
White-necked Stork, 173.
Whydahs, 126.
Woodcocks, 155.
Woodhewers, 126.
Wood-Ibis, 157.
Woodpeckers, 174.
Wood-Swallows, 127.
Wrens, 128.
Wrynecks, 176.

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